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GOLD MEDALLISTS

The Cody Gold Medal has traditionally been the most coveted and respected award in medicine. It is given to the medical school's most outstanding graduate on the basis of four years of academic and clinical excellence.

The *Journal* contacted Gold Medallists of the past and asked them to complete an autobiographic sketch along with any opinions or advice they may have cared to proffer. Their profiles illustrate the richness and diversity of medicine for these men and women are involved in every field of medical science and have worked all over the world. Their personal lives reflect their individuality as their opinions reveal their insight and experiences. Forty years of medicine are represented here and in our next issue by these doctors and we may all profit by their lives.

Dr. Henry Borsook **Graduating Year:** 1927
Santa Barbara, California
Age: 81

Dr. Borsook's autobiographic sketch was accompanied by an invitation to contact him while he visited Toronto. This I did and a remarkable free-wheeling interview ensued.

Dr. Henry Borsook is a charming man of tremendous dynamism and charisma. He answers questions gently but with a scientist's brevity and exactness.

Retired now, Dr. Borsook holds the position of Professor Emeritus at the California Institute of Technology. In the past, he has been a lecturer in Biochemistry at the University of Toronto, Professor of Biochemistry at the California Institute of Technology and Visiting Professor at the University of California at Berkeley. Dr. Borsook's medical life, however, has been devoted primarily to research.

He began work in research as a senior medical student at U. of T. under the supervision of the venerable Dr. Farquarson. At that time, he studied the lesion in pernicious anemia.

Early in his professional career, Dr. Borsook studied the biological synthesis and dynamic steady state of proteins. He was one of the first to demonstrate that animo acids are in a constant state of flux and that they can be interconverted. Later on, he worked on the physical mechanism of synthesis of creatine and creatinine as well as the physiology of arginine synthesis and energy transfer. His work contributed to the biological cycles and pathways we take for granted now.

One of Dr. Borsook's most outstanding contributions to medicine was the discovery of erythropoietin. He talked about the experiments which led to its characterization.

At Caltech, Dr. Borsook was studying hemoglobin synthesis with reticulocytes in serum and saline solutions. He found that the red blood cells did much better in serum than in saline but he did not know why. One day, while he and a military researcher were discussing high altitudes, the association clicked and Dr. Borsook tested to see if the 'serum factor' produced the same changes in a rat's red blood cell level as a high altitude environment did. It did and knowing that the serum factor promoted erythropoiesis, Dr. Borsook's studies then turned towards the nature of the factor. He boiled the serum and the factor continued to work. He wrongly concluded that it was non-protein, not realizing at the time, that the factor was a glycoprotein and hence was not denatured by boiling.

Although, we all know about erythropoietin, it is still an unexplored hormone. The major problem is that the only source of erythropoietin is the urine of children infested with hookworm. There is not enough erythropoietin in

the world available to treat one single patient. Were it available, it would possibly be valuable in the treatment of chronic anemias and in the study of erythroblast differentiation and maturation. Dr. Borsook explained that the fascinating thing about red blood cell formation is that it mimics early embryologic development—that is, the divisions conserve volume without growth in size.

Asked about today's research, Dr. Borsook pointed out that all research follows fashion resulting in rapid developments in one exciting field at a time. Biochemistry is now concentrating on DNA/RNA. Biochemistry of 1928-29 was focussed upon intermediary metabolism, a subject biochemists feel they now know enough about to hand over to the nutritionists.

He does criticize the cutbacks on medical research, explaining that cancer research, however, has not lacked funds since the beginning of the century. He believes there is no way the cure for cancer will be found before we learn more about cell growth and regulation—the neglected basic sciences.

Dr. Borsook's major interest now and in the more recent past, has been nutrition. He recalls that in 1929, next to nothing was known about vitamins and doctors knew absolutely nothing about nutrition. He feels that the role of vitamins has been one of the most important medical breakthroughs of the century.

As co-founder of the Meals for Millions Foundation, member of the Food & Nutrition Board for the National Research Council (USA) and as the inventor of Multipurpose Food, Dr. Borsook has dedicated himself to the world food problem.

He talks at considerable length and seriousness about the links of population, sanitation and undernutrition. Since 1945, there has been a famine somewhere in the world every year and there is still no international famine organization—only improvised relief measures. At these times, the major problems are food delivery and government delays. The solution to the world food problem is not one of science alone, he says, it involves government and culture.

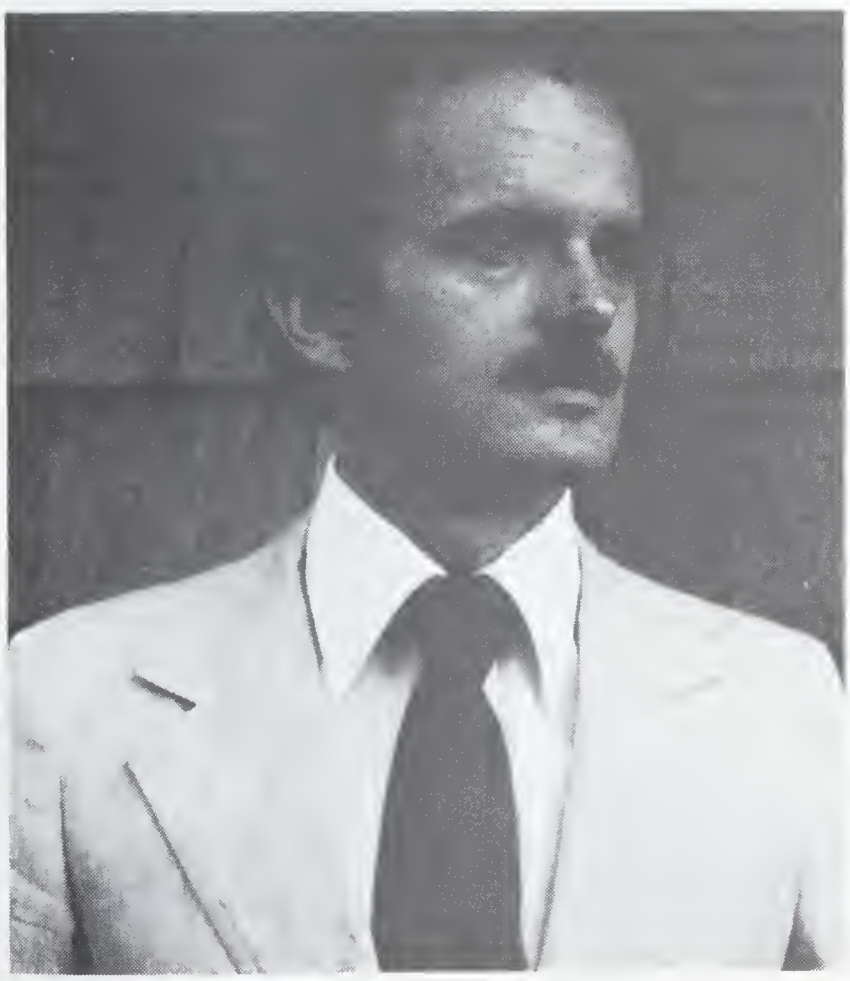
Asked about Multipurpose Food, he admits it is an emergency measure and a small scale approach for the immediate alleviation of starvation. It is made up of 45% soy protein enriched with vitamins and minerals. Two ounces of MPF provides the RDNI but it does not supply adequate calories.

Dr. Borsook's hobby since retirement is the study of China since Mao's death. His eyes sparkle as he explains that in the 14th century, China was the most civilized and advanced country in the world. With the European Renaissance, the emperor decreed that China would have nothing to do with the outside world and a vast land tract and people were isolated. What would have happened if China had not closed the door? It would probably have been the most powerful and advanced nation today.

Dr. Borsook respects the Chinese intelligence and the classless society of Mao. He says that the Western world has a lot to learn from China: the significance of the grass roots and the relationship of the individual to his government. Now, with the cultural revolution in China and the re-introduction of arts and humantiy, compounded by the industrialization and urbanization of the worker, Dr. Borsook worries that Mao's intense social experiment may decay before it reaches a harmony of the Maoist anti-Confucianism and the new productivity concience.

Researcher, inventor, teacher, humanitarian—Dr. Henry Borsook represents a Renaissance man in medicine.□

Lynn McIntyre 8T0



Dr. Philip Halloran **Graduating Year:** 1968
Toronto, Ontario
Age: 34

Present position: Assistant Professor of Medicine, University of Toronto
Staff Nephrologist, Mount Sinai Hospital and Toronto General Hospital
Member, Institute of Immunology, U. Of T.

Career Highlights: My interests in internal medicine and in nephrology both began during the second and third medical years. I became more convinced of my interest in nephrology with exposure to dialysis and transplantation at TGH during my internship. Despite fairly detailed reading in the field of immunology, I could not find the answers to many questions which arose about the immunologic aspects of renal disease and transplantation. Thus, despite a love of renal physiology, I decided to spend a few years in immunologic research. Such research, at the basic and clinical levels, continues to occupy about 75% of my time, as it has done for the last six years. I still have heavy commitments to patients, largely in seeing transplant recipients and some dialysis patients.

Personal life: Outside of my family, my main interest is in railroads, particularly steam locomotives. I have sought and photographed these locomotives in many European countries as well as in the U.S.A. and Canada. I have also photographed virtually every Gothic cathedral in England and many on the Continent. I am also interested in classical music, especially medieval and Renaissance music. I have an active interest in art, not surprisingly, Renaissance art and Gothic architecture.

Future plans: Continuing interest in basic research in immunogenetics and immunology with continued clinical involvement in renal (and other organ) transplantation. My research goal is to make a contribution to the understanding and possibly to the therapy of transplant rejection.

Advice to medical students and young physicians:

1. Don't be afraid of the detail. Welcome it and master it, even if it "won't be on".
2. Don't be confined by the apparent boundaries of various specialties. It is all medicine and there is only one medicine. Integrate and correlate the information you receive in all disciplines—you will need that information regardless of your particular career choice.
3. You never really know one subject at all until you can see clearly what is **not** known about it—so ask questions.

Your opinions on any of the following topics are welcomed:

a) adequacy of present medical training
b) government policies
c) What is lacking in present-day medical care?
d) preventive medicine/medical research

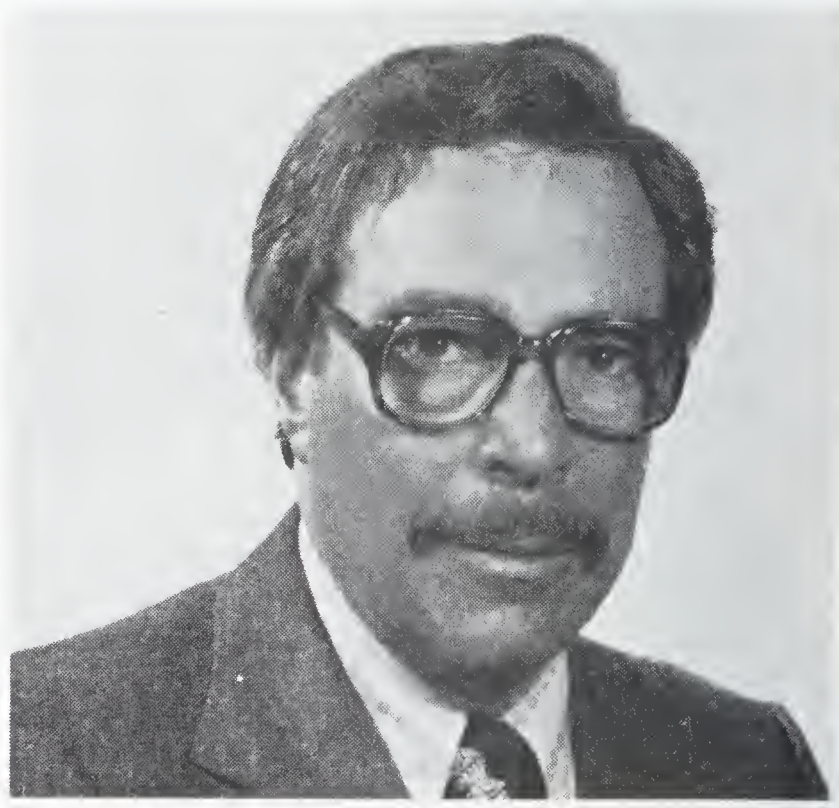
a) Present medical training is very good at U. of T.. Perhaps more time should be devoted to integrating and unifying information. If there is one deficiency, it is in failing to encourage and stimulate scientific curiosity. Students get bogged down in the curriculum and are not encouraged to question, to pursue in depth or to reach their own conclusions about problems. U. of T. has two roles: to generate practitioners, which is done well; and to generate researchers for the 1980's — this is not going as well.

b) Government policies: fiscal restraints are essential for the health care system, thus the MD is forced to evaluate and justify the application of new technologies. Too often the introduction of a new technology has not been approached with a careful developmental phase in which its cost-effectiveness and impact on the health of the public have been critically evaluated. Part of this is attributable to the fascination of MD's with new technologies, like the fascination of military men by new weapons. Fiscal restraint can then serve to force critical assessment of new developments and of therapy currently in vogue.

c) The opposite of the coin is to avoid making the health services the scapegoat for escalating government costs. The current health system runs very well as travel to other countries confirms the excellence of the Canadian model. Constraints at the present level may be justified but future cuts could be highly destructive. The tendency to cut medical research has been particularly deplorable since research and development are intimately tied to delivering the best care and ultimately solving extremely expensive health problems. The MD must make the public aware of those cuts which may undermine our system while seriously co-operating with those restraints which are justifiable.

d) It is essential that more information be accumulated about the mechanisms of disease and efficiency of treatment. Many current therapies for end-stage disease such as coronary bypass, renal dialysis, cancer surgery, could be rendered unnecessary in the future. The savings in economic and human terms would be extraordinary. Cutting research to reduce costs condemns the system to permanent reliance on these expensive therapies for diseases which will ultimately be preventable. This is false economy.□

Dr. Martin Wolfish **Graduating Year:** 1949
Toronto, Ontario
Age: 51



Present position:
a) Chief, Paediatrics, I.O.D.E. Children's Centre
b) Assoc. Prof. Paeds. U. of T.
c) Senior Physician, Hosp. for Sick Children

Previous positions held: Chief, Adolescent Service, The Hosp. for Sick Children, Toronto, 1966-1974

Career highlights: Entered practice of General Paediatrics in 1954. Confined to Adolescent Medicine in 1966. Started Division of Adolescent Medicine in the "Teen Clinic" at the Hospital for Sick Children in 1966.

At present continuing a consulting practice primarily in Adolescent Medicine and assumed position of Chief of Paediatrics at the I.O.D.E. Children's Centre in 1974. Present research interest is in Anorexia Nervosa.

Future Plans: To continue to devote my professional life to improving health care delivery to the community which the hospital that I work at serves, plus to improve the health care delivery to teenagers and the understanding of adolescents' needs amongst the medical and paramedical professions.

Advice to medical students and young physicians: In spite of the rapidly advancing technology in medicine, the art of practising medicine has not changed. The computer will not replace sensitivity, humaneness and compassion.

Your opinions on any of the following topics are welcomed:

a) present medical training is adequate in providing sufficient technology in keeping with modern day knowledge, but little time is left to think of patients as people, rather than as disease entities.

b)universal availability of health care cannot be denied to a population. However, when the physician's day includes bureaucratic frustrations, errors of the computer, dogmatic decisions made by non-medical people concerning health care without any feeling for needs, then government policies create bitterness, resentment and a feeling of hopelessness amongst the medical profession.

c) very little is lacking in the present-day medical care. I think the population today is receiving optimal care.

d) the physician's role in society is foremost as a healer. In addition to the above, the physician has a responsibility to be keenly aware of social issues, needs of people, the state of our environment and the psycho-social needs of our children and future generations. The physician should be urged not only to be a "doctor" but to take an active role wherever he can to better the place of man in our world.□

Dr. Donald Gibson **Graduating Year:** 1946
Toronto, Ontario
Age: 54

Present position: Medical Director, Ontario Crippled Children's Centre

Previous positions held: Surgeon, Church Missionary Society, Mengo Hospital, Uganda 1952-1959

Staff Surgeon, The Hospital for Sick Children since 1962

Lecturer in Surgery (under contract to CIDA), Medical School, Makerere University, Uganda 1969-71

Chief, Orthopaedic Division, The Hospital for Sick Children 1971-77

Career highlights: "General Surgery" in Uganda included obstetrics and paediatrics and, indeed, many other things. It taught me much about medicine, the Third World, people, life and the Christian Faith.

Orthopaedic practice at The Hospital for Sick Children was a very stimulating experience in work, in learning, and in teaching. An appointment to the Muscular Dystrophy Clinic led to a special interest in the orthopaedic problems muscular dystrophy lads encounter and the development of an active program for them.

An increasing concern for the return of the surgical patient to the fullest experience of life available to him was part of the background for my leaving active surgery and coming to work at this large children's rehabilitation unit.

Personal life: The late Dr. Alan Brown advised young men needing a hardworking wife to look for a farmer's daughter. I found a hardworking and fun partner for a full and mobile life in Elizabeth, a farmer's daughter, from Warwickshire, England. We have three grown children. I have continuing interests in the Church of the Messiah, the Leprosy Mission, the Sudan Interior Mission, the Christian Medical Society, the Missionary Health Institute, and Wycliffe College. I play with photography, home-building and bon-sai.

Future plans: To see the contribution of the Ontario Crippled Children's Centre to the well-being of handicapped children and their families spread and expand through the years.□

Dr. Jay Keystone **Graduating Year:** 1969
Toronto, Ontario
Age: 35

Present Position: Assistant Professor of Medicine,
University of Toronto
Director, Tropical Disease Unit,
Toronto General Hospital

Career Highlights; The major portion of my practice is the management of patients referred with parasitic infections and the investigation of problems in returning travellers and immigrants. I am involved in the teaching of medical students and residents who rotate through the Tropical Disease Unit at Toronto General Hospital. In addition, I attempt to spread the gospel to travellers, public health workers and physicians, etc. This involves many hours each year in lectures outside of the academic community.

My research work is centered on clinico-epidemiological studies of parasitic infections endemic to Canada. We are studying giardia transmission in daycare nurseries, parasitic infections in the gay male community and toxocariasis in veterinary workers. We are also involved in carrying out safety studies on new drugs used for parasitic infections.

Between my 2nd and 3rd year of residency training, (1972-73), my wife and I took the year off to travel around the world. We worked in a mission hospital in Ghana for two months and then played tourist for the next eight months. Our most recent travel abroad (1976), consisted of a year of clinical tropical medicine field work in Sierra Leone, Nigeria, S. Africa, Brazil and Venezuela. Our calling card is "have worms—will travel; wire, paludrine".

Personal life: I am married to a delightful woman who happens to be a physician. She is a family practitioner who also trained in tropical medicine with me in London. We have a four year old daughter, Danielle, who is the third member of our team: She gets the worms which we treat. We like to ski, dance, attend the theatre, and watch Clint Eastwood and Sam Peckinpah movies. I am starting up a jogging program (5 min. run; 25 min. recovery).

Future plans: To establish a liaison between an academic centre in the tropics and the University of Toronto to allow for an exchange of personnel and ideas.

To introduce teaching programs which would be held in different parts of the country to educate physicians and public health workers on the diagnosis and management of tropical and parasitic infections.

Advice to medical students and young physicians: Medicine is an unique career which involves a heavy commitment to daily work and continuing education. It is important to establish priorities early in your careers to ensure that medicine does not encompass all other aspects of life to the exclusion of family and extracurricular activities; a thing simpler in the saying than in the doing under the pressure of academic life and professional demands.

Moreover, I would advise you to broaden your horizons while you still have the flexibility and energy to do so...aptly put by Rudyard Kipling:

All good people agree,
And all good people say
All nice people like us are we
And everyone else is they:

But if you cross over the sea
Instead of over the way,
You may end by (think of it!)
Looking on we
As only a sort of they!

Comment:
Canada...A "1st World" Country with 3rd World Problems in Health Care Delivery:

Until recently, I, like most other Canadian physicians, believed that the problems of medical care in N. America were totally different from those in the developing world. It was easy for me to criticize the priorities in many 3rd world countries which emphasized curative rather than preventive medicine. I scoffed at the "white elephant" teaching hospitals which provided care of 5% of the population, utilizing 40% of the health budget to do so. I was disturbed by the concentration of physicians in major urban areas and their absence in rural areas of the 3rd world. I was particularly discouraged to learn that our foreign post-graduate trainees were staying in Canada instead of returning home to disseminate the knowledge acquired here. These are indeed the major problems in health care delivery in the 3rd world; but are they really much different from our own?

The North American attitude to medicine has created a self-perpetuating system which sustains the practice of curative medicine to the virtual exclusion of preventive medicine. We have, in our highly sophisticated mechanized society, devoted tremendous energy bypassing coronary arteries and providing computerized intensive care units, yet we have learned little about how to stop cigarette smokers from destroying their lungs. It is mind-boggling to consider what it costs our society in lost manpower and revenue to care for chronic bronchitics and alcoholics whose preventable diseases are caused by an excess of self-administered "drugs". And what of the cardiac cripples, diabetics and osteoarthritics whose conditions are aggravated by obesity, if not caused directly by it? For all the time, energy and money spent on saving lives, we have done little to change the life styles which have created the very conditions requiring our intervention.

How incongruous it is that we are currently importing physicians from the 3rd world to work in **our** rural areas because Canadian physicians are unwilling to work outside of major urban centres. In sophisticated settings we are teaching our trainees from rural areas of Canada to use sophisticated diagnostic tools. No wonder they find it difficult to return to "small-town life" where clinical know-how may be all that is available to make a diagnosis.

There are no easy solutions to these perplexing problems. What is required is a re-evaluation of our priorities in health care delivery. We need to shift our emphasis to the prevention of disease before the extraordinary costs of treating disease destroy our system entirely. We must examine other methods of health care delivery for our rural areas; in particular, the use of medical auxillaries.

This is the direction which medical care in the "1st world" must take. Perhaps those in the 3rd world will learn by our example.□

Dr. Wilfred Wise **Graduating Year:** 1942
Evanston, Illinois
Age: 59

Present position: Senior Attending, Department of Medicine, Michael Reese Hospital, Evanston, Illinois

Education obtained after M.D.: After graduating I came to Michael Reese Hospital as an Ellen Mickle Fellow to spend a year in cardiovascular research with Dr. L.N. Katz, stayed on as an intern and medical resident. After military service from 1945 to 1947 and a further medical residency in a Veteran's Administration hospital, I began private practice in Internal Medicine in 1948.

Career Highlights: At the beginning of practice I tried to resume research in Dr. Katz's department but found the attempt too frustrating and gave it up, confining my career to the practice of Internal Medicine. I was not aware then that I was experiencing the effects of a more universal change in the practice of medicine in which my role model of the physician who effectively combined practice, teaching and research, was being supplanted by physicians who devoted full time to only one of these.

Because I was uncomfortable where I did not find high standards, I maintained Michael Reese as my hospital affiliation, even though the hospital was South and I was practising near the northern edge of Chicago. I have lived through and am still living through the effects of the pull of the periphery on me and on my patients. In the past few years the center has been strengthened by the exponential resurgence of Michael Reese Hospital conjoined with the University of Chicago, as a center for academic medicine, research and both secondary and tertiary care. Michael Reese is a stimulating place to work with a warm, friendly teamlike atmosphere, comfortable for the private attending.

Advice to medical students and young physicians:

There is no advice which I know to give. Any attempt would be impeded by the bias and ignorance of a different age, a different generation and a different country. What makes me most sensitive about even trying is that I am aware of how much all principles of attitude, behavioral approach and action suffer from the effects of adjustment and abrogation and how often they are even totally abandoned.

The trouble is that we inherit a problem-oriented life and try to practise in a problem-oriented society. A specific problem may not totally permit the application of general rules and the coexistence of several problems may introduce conflicts and inconsistencies which create the need for therapeutic compromise. Sharp focus on one particular problem may cause us to forget the others, or to be too ready to accept the tacit excuse to ignore them.

Medical problems tend to increase in number and complexity with patient age; so does the problem-oriented record of persons and society become thicker and more complex with the age of each. The physician has to be aware of what the other problem solvers are

doing to protect the integrity of the whole patient and to help guard against therapeutic accidents.

Comment: I would like to share with you some thoughts I have which involve a linguistic approach to the learning of Medicine. To compare the learning of Medicine to the learning of a language involves no new or original concepts. It is simply an expression of the modern idea that systemized information is acquired and stored in bits, and that these become organized in the mind in multifaceted ways.

A child learns to understand, speak and later to write language in a largely automatic way because the information to which the child is exposed is innumerably repetitive. In keeping abreast with current medical information, medical journals represent the conversation of medicine. The same bits of its language continually appear in different relationships in the articles in the journals.

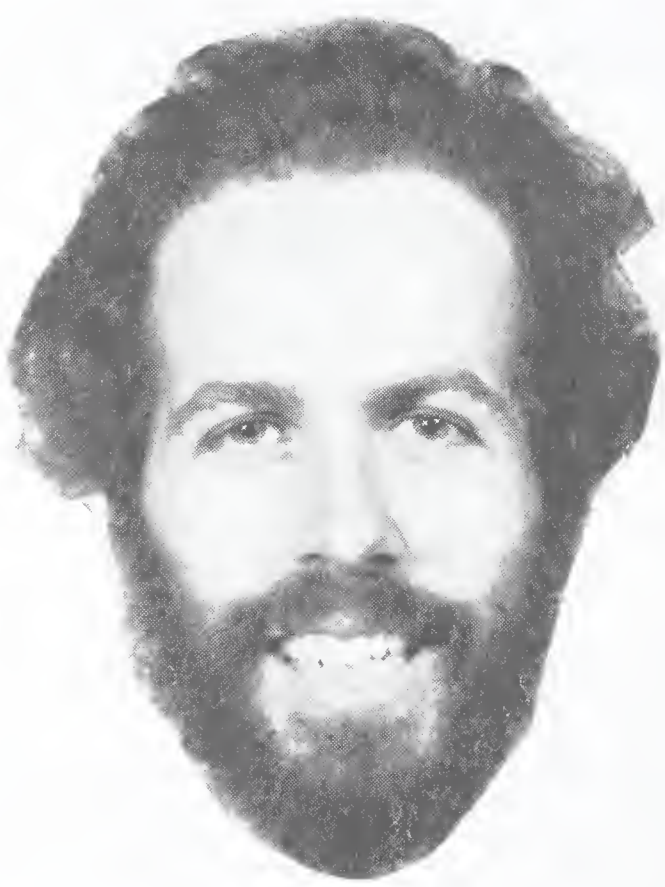
In my continuing medical education, this had led me to be able to approach the journals in a more casual manner, with less panic, knowing that what I only partially understand at present, I will understand more of as time goes on. Particular attention is paid to the introductory paragraphs and summaries.

Another linguistic aspect has to do with jargons. Jargons are modifications of a language within certain functionally entwined groups. Jargons develop as new outcroppings of investigation of practice grow until the field can no longer be understood by one who does not know that particular language.

Much of this jargon can be learned by current reading and it will then become evident that many of the ideas and concepts are familiar ones, partly translated to facilitate communication between experts in the field.

Finally, one can go to the question of "The Three R's". How should the language of medicine be taught? Should the emphasis be on the tradition of teaching structurally and learning by rote, or should so-called progressive methods of teaching be dominant? I do not pretend to have the answer. It is customary at my age to be skeptical about modern methods. The solid foundation of training which I received at the University of Toronto was not only superbly structured, but its learning was simplified by the finiteness of examination preparation.

On the other hand, I have observed in the cases of two of my own children (now medical doctors) as well as others, how apparently incompletely current students are taught basic sciences e.g. anatomy and embryology. And yet, I am amazed at how much ability they have even as junior clerks to grasp clinical concepts. Just as there are different methods of instructing a language, there are varied successful ways of teaching the language of medicine. □



Dr. Michael Singer **Graduating Year:** 1964
Kingston, Ontario
Age: 37

Present position: Associate Professor of Medicine, Assistant Professor of Physiology, Queen's University.

Career Highlights: After graduating in 1964 I did a rotating internship at the Toronto General Hospital. Then my wife and I spent five years in Boston where I did training in general medicine and nephrology at the Beth Israel Hospital (a Harvard teaching hospital). Our first two children were born in Boston. In 1970 we moved to Cambridge, England where I spent a year doing research in membrane biophysics, specifically, the use of phospholipid bilayers and phospholipid-protein membranes as models to study general mechanisms of drug action.

In 1971 we moved to Kingston. Our third child was born there in 1973. Presently, I am at Queen's University in the above positions. It is interesting that I was hired by Dr. E. Yendt, another gold medallist from Toronto, who at the time, was head of the Department of Medicine.

The family and I enjoy living in a "small" city since we believe that we have more ready access to many activities than we could in a larger city. We enjoy sailing, biking, running and cross-country skiing. The latter we can do right out of our backyard since our house borders on a conservation area.

My wife has completed her honour B.A. since living in Kingston and now plans to obtain her M.A., probably in sociology.

As far as future plans are concerned, I am hoping to take a sabbatical in 1980 in order to broaden my research activities.

Comment: As a medical researcher, I believe there is still not enough financial support for research. Also, government must have a more coherent and long-range program for support of research so that planning is possible. □

The O.M.A. Student Section: Why do We Exist?

"The complete physician is not a man apart and cannot content himself with the practice of medicine alone, but should make his contribution, as does any other good citizen, towards the well-being and betterment of the community in which he lives." Code of Ethics, Canadian Medical Association, 1978.

Each September, another six hundred or so men and women enter the five medical faculties in this province to begin the long, arduous study of medicine. Each one of them has a different outlook as to what the study of medicine involves. Some approach with trepidation, a "what's it going to be like" attitude, some have friends or relatives who have been there and know what to expect, others simply don't care. However, the vast majority seem to be missing a perspective which, although not immediately useful to the undergraduate medical student, is important nonetheless.

Medicine is more than the anatomy, biochemistry, or what have you. It has a long tradition and history, has elements of economics, politics, social and moral issues thrown in for good measure; unfortunately, one does not get the opportunity to be exposed to this during the course of the formal four-year medical curriculum, either through benign neglect, but more because there just isn't enough time. This may foster an apathy in the future medical practitioner which may prove to be harmful to his or herself, and to the profession as a whole.

We, as medical students, are junior members of the medical profession; thus, while having interests and issues which concern us immediately as university students, we have an obligation to be aware of what is going on in the profession outside of the faculty. Decision making processes are slow, and today's committee proposals are tomorrow's legislation. This will not only affect the more senior members of the medical profession, but will also affect the way we will practise medicine once we graduate.

The Medical Student Section of the Ontario Medical Association was formed in 1972, and it is designed to bridge the gap between the future medical practitioner and the activities of his chosen profession. The section Executive consists of representatives from the five Ontario medical schools. Regular meetings are held where issues important to the medical student are discussed, and possible courses of action are planned. In addition, the chairman of the section sits as an observer, or more accurately, a non-voting contributor, on the O.M.A. Board of Directors — this illustrates the fact that the more senior members of the profession are interested in keeping informed about our concerns, a point which was well illustrated recently when the Board of Directors wrote to the Minister of Health indicating their support for increased stipends for clinical clerks.

Although the membership fee is reduced for medical students, this by no means makes us "second-class" members. Members of the Student Section are **full** members of the O.M.A., as well as the Canadian Medical Association, and are entitled to full benefits and privileges of membership.

In this day and age, the medical profession needs some means of expressing its interests, both to its members and to the general public. Medical students are by no means isolated from this goal. Become aware and become involved in the Student Section of the O.M.A. — we exist for you!□

Peter Bistolarides 8T0
Chairman, S.S.O.M.A.

Ontario Medical Association

as-so′ci-a′tion:

"A voluntary organization of persons joined together to pursue a common purpose or objective mutual to all."

The Ontario Medical Association is an association of practising physicians, interns, residents and medical students which, under a democratic constitution, pursues not only the advancement of the medical profession, but also that of medicine itself. The O.M.A. encompasses all specialties of medicine and represents more than 13,500 physicians and aspiring physicians in the province. Its aims are your aims.

For information on joining the Ontario Medical Association, simply write Anne Todd, Supervisor of Membertship, O.M.A., 240 St. George Street, Toronto, Ontario M5R 2P4; or phone 925-3264 (Toronto), 1-800-261-7215 (toll-free, outside Toronto)

Joining is only your first step in participation.

Mental Changes with Physical Illness

Chris Young 8T0

While working as a summer student at the St. Thomas Psychiatric Hospital (STPH) in St. Thomas, I noticed that there seemed to be a correlation between the degree and type of mental illness and physical ailments. After a bit of investigation, I discovered that there is a whole field called psychosomatics and that it is not new. It began in Greece in the 5th century B.C. when people realized that the person was not two distinct entities—the mind and the body—but a whole. Illnesses that affect the mind also affect the physical health and vice versa. Grub, a professor in medicine in Leydig, wrote in 1747 "the reason why a sound body becomes ill or an ailing body recovers very often lies in the mind. Contrariwise, the body can frequently both beget mental illness and heal its offspring".

Psychosomatic medicine is not medical folklore, nor is it a school of philosophy. It has been an organized field of scientific investigation for 50 years and now, many theories of physical ailments (ulcerative colitis, arthritis) being caused by unconscious mental conflicts are being investigated. In this article, I will demonstrate that mental illness can be caused by primary physical ailments. It seems that the more seriously visible the physical disability is, the greater the degree of mental illness. Cases used as examples are from the STPH.

The American Academy of Psychosomatic Medicine formerly believed that "theoretically, every disease is psychosomatic since emotional factors influence all bodily processes through nervous and humoral pathways"[1]. It is true that emotionally aroused people may present with physical complaints due to increased secretions of hormones (i.e. adrenaline, noradrenaline, thyroxine, testosterone, insulin, cortisol). Certainly the social environment of the home, family, job can affect the amount of nervous and humoral activity in an individual. But not all organic illnesses have underlying mental conflicts to initiate them. Did a Down's child wish to have an extra 21 chromosome? Did a motor vehicle accident victim worry himself into epilepsy after debilitating head injuries?

The mind-body complex has been studied by many people in its relationship to the external environment and the concept of physical illnesses causing mental disorders is not new. How patients respond to a bodily assault varies according to the disease, the person and the timing in an individual's life. The ability to cope with the problem depends on the person's state of mind, family support and what the meaning of the ailment is to the patient. (How long will I be like this? Does everybody see that I'm not well?)

There are mental symptoms of every organic illness. The patient recovering from an acute myocardial infarction will often lose self-esteem and have feelings of inadequacy. But, rarely do cardiac patients need long-term psychiatric help. By the time they are physically rehabilitated, they are usually mentally stable. Also, a heart attack is a very socially acceptable sickness leaving no visible residuum. In the STPH there was an abnormally low number of post-myocardial infarction patients as compared to the normal population.

It is a well-known fact that patients who have been constipated for any length of time become depressed. Common acute diseases and injuries that heal to normalcy also bring on short-term mental changes. People with a cold often suffer from depression with a slightly flattened affect. Anxiety and restlessness come with broken bones and other musculoskeletal injuries.

Patients with long-term illnesses (chronic renal failure, rheumatoid arthritis, chronic gastrointestinal disorders) rarely seek psychiatric help but they do develop what is known as a "chronic disease personality". Research done by Spengel, Ehrling, Glass[2] using the Minnesota Multiphasic Personality Inventory (MMPI) and the Tennessee Self Concept Scale (TSCS) on different chronically ill patients (rheumatoid arthritis, low back pain, chronic ulcers and multiple sclerosis) found that these populations have personalities similar to one another and significantly different from the general population, scoring highest in the neurotic triad of hypochondriasis, depression and hysteria. It has also been found by Schwab, Traven and Warheit in the Stirling County study, that those people with a greater number of bodily illnesses were ones experiencing the greater number of mental disturbances.

Those people whose mental changes are severe enough in response to organic disease to require psychiatric help are those who are damaged or disfigured enough to cause social shame or are those who would prefer to assume the helpless, dependent social role of 'gimp'. Patients who were severe

enough to be hospitalized in STPH were classified as:

a) organic brain syndromes
b) accidental disfigurement
c) disfigurement from disease
d) borderline retardates and subnormality

Organic Brain Syndromes

"Organic brain syndromes are psychiatric disorders caused by or associated with impairment of brain tissue function. Since the brain is the organ of the mind, any interference with the brain will produce disordered mental activity".[3] Most organic brain diseases are accompanied by impairment of

1) orientation
2) memory (especially recent)
3) insight
4) intellectual function
5) affect

When the patient tries to compensate for his decreased cognitive abilities and his incapacity to meet the ordinary demands of life he may lose touch with reality and be diagnosed as psychotic. The adjustment mechanisms become striking as the patient tries to appear normal. He becomes disoriented. He may make perceptual errors and go on to delirium. There is basic panic as the person with an organic brain syndrom tries to combat what is happening to him. Patients may become paranoid, display schizophrenic manifestations and even visually hallucinate.

An example of the struggle for normalcy is seen in Jim B., a 45 year old man with an onset of Huntington's Chorea at the age of 39. Jim has obvious choreic movements, an ataxic, characteristic 'dancing' gait and definite dysarthria. His whole being is intensely involved in appearing normal. He speaks deliberately, tries to control his movements and tries to interact in a socially correct manner. He watches to see your reaction to him.

A young girl who has not lost insight and understands her illness very well is Susan S., a 25 year old female with an astrocytoma (slowly growing, infiltrative tumor of supportive neuroglial cells that often cavitates), diagnosed at age 13. She is slow and uncoordinated with noticeably divergent eyes and enlarged cranium and face. She is aware that she is losing her brain and that her clumsiness and personal appearance are due to her tumor. She has a tendency to be irritable but generally can handle the STPH setting with no evidence of psychosis.

Patients with tuberous sclerosis (Bourneville's disease—dominantly inherited disease with extensive astrogliosis and deformed areas of cortex) such as Judy S. and Brian C. are prone to epileptic seizures and widely fluctuating mood swings. Both were diagnosed initially as psychotics.

If acute, the organic brain syndrome has different side effects. The patient has even less chance to adapt and accept his condition, so that behaviour is violent, often self-destructive and suicidal. The patient acts out his frustrations and rage at losing his brain and tries to fight the oncoming dementia.

Accidental Disfigurement

A patient who has been maimed or injured permanently has a special personality of self pity or feelings of guilt. The patient's psychological formulation is one of "One can tell my disgrace by looking at me". Motor vehicle and industrial accidents that have left a visible deformity or left a chronic pain cause mental disorders. The person will have a distracted state of mind as his attention flickers to the source of his discomfort. He worries that people regard him as 'awful' and he dwells on the incident that has left him this way. The more visible the deformity, the more likely it is to give lasting mental changes. The patient's body image is one of a maimed person and therefore, changes the personality to a maimed one.

Brian McP. is a 22 year old schizophrenic who dwells on a childhood car accident that left him with facial scars.

Theo C. is a 67 year old male who has been hospitalized for 18 years. His entire left face has been scarred and distorted due to an industrial accident that spilled acid over his upper left body. He is very seclusive, mumbles when he speaks and makes minimal social contact. He is aware that people stare and he shows signs of 'paranoia'.

Patients who have suffered strokes or have had accidents to the lower limbs that cause them to walk in an unusual manner are reminded with each step that they are 'weird' and this brings on feelings of paranoia and embarrassment.

People with aggressive tendencies and who feel that they know who is responsible for their accident may act out violently and often be labelled psychopathic.

Disfigurement From Disease

This is very much the same as accidental disgifurement but there is more depression and feelings of hopelessness. It is something which has happened to their bodies over which no one in particular is responsible.

John B. is a 41 year old Polish auto mechanic who developed a mixed adenoma of the pituitary with resulting acromegaly. His hands became spadelike and due to their size he was no longer able to continue with his job. He showed a reactive depression with apathy and insomnia. Because he had no other training and considered himself too old to be hired in another field, and because his wife and family had left him, he was under considerable psychosocial stress. If John's disease had been one that did not affect his livelihood and if his family had been more supportive, then he may not have reacted in this manner.

Patients who have a visible problem such as obesity in a world where obesity is repulsive, are very prone to depression, paranoia and feelings of inadequacy.

Borderline Retardates and Subnormality

A good example of organic shortcomings bringing on mental disorders is seen in patients with a defect in intelligence (usually with an IQ of 70 or less). They can be genetically subnormal, or of potentially higher intelligence but have experienced brain damage. Often these patients have physical handicaps such as poor vision or deafness that prevents

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Law and the Practice of Medicine

Roman Czudyjowycz 8T0

"An ounce of prevention is worth a pound of cure."

Nowhere is the above proverb more applicable than to the practice of medicine. Right from the day of our first clinical experience, we, as future physicians, are taught how to recognize the manifestations of disease and how to go about curing it. In the rush to cram literally volumes of signs and symptoms, facts and figures, into our heads, the 'preventative' aspects of practising medicine (both medical and practical) are often given merely a cursory glance. In our fret over "what to know for exams", we often take the attitude, perhaps rightly so, that our minds are bursting with information already, and the addition of more, which is not immediately applicable, can be deferred to a later date. This frame of mind seems to carry on after medical school has finished, only the reasoning may change slightly. Now the practising physician seems far too busy in his day-to-day work to take time out to learn something of the workings of the world around him. It all seems very complex — finance, economics, law — and besides, it can be reasoned that he is now earning enough to hire specialists to look after those areas for him. Why then waste his valuable time?

The answer, as far as the legal aspect is concerned, usually arrives in the form of a writ, informing the doctor that one of his patients is seeking damages for negligence; or in the form of an investigator from the College of Physicians and Surgeons, requesting that the physician surrender his books and records for audit immediately. At this stage, even a legal wizard may be powerless to render any aid, and so the practitioner will suddenly be forced to learn those 'preventative' aspects which he had neglected earlier. Unfortunately, however, the physician may pay dearly for this lesson, and be left very bitter and antagonistic towards those legal bodies with whom he has had confrontations. The end result could be a change in his practice to that of defensive medicine in the extreme — with consequences for both his enjoyment of his work and the service rendered to his patients.

The aforementioned, extreme example can be avoided very simply by understanding the more important laws that govern our profession. They are not as complex as they seem. The understanding of the principles involved does not necessarily require an extensive background. In general, the applicable laws can be divided into two broad areas: civil laws which deal with infringement of the individual's interests or rights, and criminal laws which deal with infringement of the interests of society.

Legal Definitions

The breaking of a law is known as a **wrong**. The remedy imposed by the courts for civil wrongs is (usually) **damages** (money), while the remedy for breaches of criminal laws is some form of punishment for the lawbreaker (fines or imprisonment).

Civil law is common law handed down through the centuries and judge-made law (case law) when the existing common law does not fit the situation. Civil wrongs are divided into breach of contracts and torts.

Breach of contract is self-explanatory in that one party fails to carry out promises made to another party. Although to a great many people it would seem that this would not apply to the doctor-patient relationship, the truth is that almost all medical practice is normally based on contract. An oral contract, made every time a doctor treats a patient, is just as binding as one written on paper such as a mortgage or bank loan. Under ordinary circumstances, however, the doctor, not guaranteeing a cure, can only promise to use his best judgment. Once the physician undertakes to treat a particular illness in any patient, he must continue treating to the best of his ability, or properly terminate the relationship, even if the original service was performed without charge. The relationship may be properly terminated by an agreement limiting the time of service, a voluntary switch by the patient to another doctor, or by the doctor giving sufficient notice to the patient that he will withdraw his services in order that the patient can find other medical help. To withdraw treatment without reasonable notice constitutes abandonment and would render the doctor liable for negligent behaviour or breach of contract.

A **tort** by definition is a civil wrong other than a breach of contract which the law will redress in an action for damages.[1] This definition gives very little useful information but for our purposes torts are broken down into

intentional torts (assault, battery, false imprisonment) and negligence.

Assault constitutes the threat to apply force without consent or legal justification to another person, causing apprehension. This rarely if ever applies to medical practice. However, its meaning is often confused and considered together with that of battery.

Battery, on the other hand, is the actual application of force to another without his consent or legal justification. The force applied does not have to be violent (touching), nor does it have to cause actual physical harm. The application of this to medical practice is obvious. To carry out examination of patients, and in many cases to give treatment, requires that the doctor physically touch the patient. Unless the patient consents to this touching of the body, it constitutes battery.

Consent

Consent can either be expressed or implied. Expressed consent can be either verbal or written while implied consent can be verbal, written or based on the patient's conduct. As an example of the last type of consent, a patient who lines up to be vaccinated and holds out his arm for the needle is giving implied consent for the injection.[2] However, where the patient, expressly prohibits the procedure, consent cannot be implied, nor can silence on the part of a patient (especailly one with language difficulties) be taken as implied consent.[3]

To be valid, the consent must be freely given and must be based on full and frank disclosure of the nature of the procedure and the risks involved. A patient must not be under duress to consent. A doctor, for example, must not use undue pressure to obtain a consent from a patient for a particular procedure. All the other options must be presented and the patient allowed to choose. A consent is invalid where the patient knows the nature of the act or procedure but is deceived as to its potentially harmful consequences. Much controversy has come up over this point of law in that the "potentially harmful consequences" or "risks" of any medical procedure are multiple and varied and often unpredictable. The courts have been rather fuzzy as to what level or risk is significant enough to warrant informing the patient (and possibly scaring him). Risks as low as 1% have been accepted as significant while other as high as 30% have not. Luckily, the law does recognize the doctor's right not to have to educate a patient extensively about his condition and its treatment and assumes that anyone seeing a doctor has some 'basic intelligence'. A patient is expected to realize that any medical procedure carries some risk. Were this not the case, it would be virtually impossible to carry on a practice and treat a reasonable number of patients in a day. However, in today's complex society the concept of basic intelligence varies tremendously from person to person, thanks to modern wonders such as "Reader's Digest", "Woman's Day", "The National Enquirer", etc. It is therefore very difficult to define what basic intelligence should comprise.

The law also recognizes that where consent has been given for a major procedure, consent to a subordinate procedure need not be obtained, if the latter is an integral part of the former, involves few risks, is of a technical nature which the patient would not understand, and the doctor feels that disclosure would unduly harm the patient's morale.[4] Thus, a surgeon may give a patient routine injections of antibiotics following an operation withoug obtaining consent for each. On the other hand, consent to an appendectomy is not consent to the removal of a gall bladder so that the consent must be specific to some extent.

The extent of the above so-called 'therapeutic privilege' is subject to question. In most cases, it applies to recognized or orthodox treatment for a defined problem, if orthodox treatment exists. Using the above example, a surgeon who varies the type of antibiotic given or the frequency or the route of administration, etc., may be leaving himself open to litigation if something unexpected occurs.

In medical experimentation, the above 'therapeutic privilege' does not apply. The doctor is obliged to give full and frank disclosure of **all** facts which might influence the subject's decision to participate. As indicated, the doctor may be justified in keeping technical facts from a patient under his care to avoid unnecessarily frightening him, but such a principle has no justification in medical experiments.[5]

Consent given for experimental purposes may be compromised in the eyes of the law, by a number of factors, the most important one being money. It is common practice to receive some remuneration for participation and expense but if the amounts involved become excessive, the law may rule that the consent was actually purchased and therefore void. Another contentious area is the use of prisoners who, while appearing to consent freely, actually may be coerced by the fact that their cooperation will be noted and considered when parole is being discussed. In the final analysis, even if consent is informed and freely obtained, the courts may not accept it because the principle of the law since Elizabethan times has been that a person does not have the right to incapacitate himself and thus become a burden on the community.

Although the above facts concerning experimentation may seem clean cut, there exists a grey zone between therapeutics and experimentation, especially with respect to diseases which really have no cure or defined medical treatment, or those conditions where multiple treatments may be accepted medical practice. These cases must be decided on an individual basis, since no real principle of law covers them.

In either case, the patient's or subject's legal capacity to consent must be taken into consideration. The main factors here are mental competency and the patient's age. Confusion exists in both areas, the former being covered to some extent by The Mental Health Act, now under revision, while principles covering the latter are scattered among various acts and regulations as well as case law.

For example, by statute, 18 years of age is currently the age of majority in Ontario, but due to "The Mature Minor Rule" medical autonomy is public hospitals requires that the patient 16 or over sign consent for an operation.[6] Outside of hospital a 16-year-old can be treated for venereal

disease without his parents' knowledge or consent.[7] Usually, treatment of any minor (less than 18 years of age) requires the consent of a parent, guardian or next of kin. However, depending on the circumstances of the so-called child, the above may not be a hard and fast rule. The principle of the "emancipated minor" brought out in Booth *v.* TGH (1910) referred to an autonomous minor living on his own who was economically severed from his parents' control This may or may not be carried further. For example, the problem of prescribing a means of contraception to a girl younger than 18, who socially and sexually, may be very independent of her parents, has not been resolved in law. Therefore, the physician must weigh each case individually, taking ethical as well as legal considerations into account.

Of course, where an emergency exists and treatment cannot reasonably be postponed, the doctor is privileged to operate or treat, to preserve the patient's health or life, without obtaining consent. Thus doctors can operate on unconscious victims of car accidents, etc.

Similarly, a surgeon in the course of an operation is privileged to deal with unforeseen conditions which threaten the health or life of a patient.[8] However, when, upon opening the body, a surgeon discovers some unforeseen circumstance which is not immediately fatal or dangerous, he may **not** attend to it even if it is more convenient at that time than at a later date.[9 10]

A patient who is unhappy enough with his practitioner to bring suit, has a much easier time, technically, to bring in battery by reason of lack of informed consent, than to bring a negligence action, as will be discussed later. This is because the onus of proving that consent was informed and given voluntarily, other than in an emergency, **lies with the doctor.**[11]

Negligence

Even with informed consent to treat, the physician must avoid doing harm to the patient through lack of proper care. Failure to do so would constitute negligence.

There are four elements in a medical negligence action which must be proven **by the patient** 'on the balance of probabilities.' These are:

1) A duty, recognized by law, owed by the doctor to the patient and conforming to a certain standard of care,
2) Failure to conform to that standard of care,
3) Actual harm to the patient,
4) A casual connection between the doctor's breach of duty and the resulting loss to the patient.

Generally, the law will impose a duty of care in any situation in which the conduct of one individual creates an unreasonable risk for another individual. As stated earlier under contracts, once a physician has accepted a patient for treatment of a specific condition, he must continue that treatment or terminate the relationship properly. Furthermore, the law demands of the doctor a standard of care consistent with his special skills, knowledge and training. He will be held to the standard of care exercised by the'average' member of the group within his profession. Beginners are given no special consideration. However, the law will not expect a general practitioner to show the same degree of skill as a specialist, nor will it impose on a rural practitioner with fewer facilities, the same standard as it would on a doctor in a large city.[12] The law does require that the physician make the best use of the available facilities. This includes the consultation of specialists in situations which call for a special expertise. Failure to do so is negligence.[13]

To a large extent, the profession sets its owns standards of care and adherence to the customary practice will be a good defense unless the practice itself can be shown to be negligent.

Having proved negligence, the onus is then on the patient to prove that negligence of the doctor caused actual harm (physical or mental) to the patient. Hurt feelings or embarrassment are not vindicated by tort law (though the College of Physicians and Surgeons may have something to say about this). To establish this causal connection, as well as delineating what exactly the standard of care is, at the time, usually requires the use of expert medical testimony. This may or may not be easy to obtain, depending on the complexity of the problem. But this is time-consuming and expensive and in the event that the 'experts' disagree, the action may be dismissed.[13]

Therefore, since it is so difficult to succeed in an action for negligence, many lawyers today are advising their clients to sue for battery on the basis of lack of informed consent because, as stated earlier, the burden of proof then shifts to the doctor.

There is one exception to this—namely, the doctrine of **'Res Ipsa Loquitur'.** Translated this means "the events speak for themselves." This doctrine can be invoked where an injury results from an accident, which could not normally occur without negligence on someone's part. At first, the courts were reluctant to apply R.I.L. to medical malpractice cases where the judge or jury would require technical knowledge to distinguish malpractice from misfortune. But recently the doctrine has been used with increasing frequency, provided expert evidence is available to assist the judge in evaluation of the accident.[14–19] In addition, the accident must raise an inference of negligence on the part of the doctor. Generally the patient must establish that the doctor had exclusive control of the situation causing the injury at the time the injury occurred. He must further prove that there was no possibility of subsequent intervention by another person capable of causing the injury.

This principal is very important in that if the judge accepts its applicability in a particular case, the burden of providing evidence shifts from the patient to the doctor to prove that he did not act negligently (ie. he used reasonable skill and care in carrying out his duty).

The above has concerned itself with torts committed against already living and functioning human beings. What about those who are not yet born or who die as a result of a tort?

The common law, and recently enacted statutes in Ontario,[20] both recognize the independent status of a

fetus and give it some legal protection. If the child is born alive, it will have an independent cause of action for any losses caused by negligently inflicted prenatal injury.[21] However it would appear that if the fetus dies or is stillborn, there will be no independent cause of action, although the mother may claim for nervous shock.[22] How this would apply to medical procedures causing fetal malformations has yet to be tested in the courts.

The common law used to hold that any tort actions died with the plaintiff, but this is no longer the case. Under the Fatal Accidents Act, the deceased's dependents are compensated for financial support they would have received had the deceased lived. Thus any tort action, except libel and slander, can continue after death.

The basic civil laws as they apply to medicine have been covered in some detail since they are scattered widely in common law, case law and statute. In the following text, criminal law, as it applies specifically to the physician, will be given a much more cursory examination since all of the laws are written in statute and interpretation by judges is much more limited.

The source of all criminal law is legislation at the federal, provincial and local levels. Criminal wrongs are divided into the less serious Summary Conviction Offences and the more serious Indictable Offences. The remedy for committing any criminal offence, as stated earlier, is punishment of the offender. Offences are further divided into those requiring **mens rea** ('guilty mind') and those of strict liability only, **actus res** ('guilty act'). This area of law generates some confusion as it gives rise to offences of criminal negligence.

Criminal, or advertent negligence, occurs when an individual foresees the possible consequences of his actions, but is not concerned about the results. On the other hand, someone committing the tort of negligence, as described earlier, has no foresight of the actual consequences of his action, but does not act with due care to reduce the risk of these consequences occurring. A sloppy physician, whose error results in personal injury to a patient, may be liable for negligence on both these areas. An example of this could be a doctor who does not sterilize needles between injections.

Legislation

The volume of legislation, both federal and provincial, of concern to the physician, is immense and therefore cannot be dealt with in detail in a paper of this scope. The more important Acts will be mentioned by name only since a summary of them can usually be purchased at any federal or provincial bookstore.

As far as federal legislation is concerned, much of the important material is contained in the Criminal Code:

S.14- laws of concern with respect to euthanasia

S.198-204- deals with preservation of life and criminal negligence

S.251-252- deals with abortion

The Narcotic Controls Act and the Food and Drugs Act deal extensively with the prescription and dispensing of drugs.

The balance of pertinent legislation is found in provincial statutes:

The Coroners Act, 1972
Human Tissue Gift Act, 1971
Vital Statistics Act, 1970
Public Health Act, 1970
Child Welfare Act, 1970
Mental Health Act, 1970
Public Hospitals Act, 1970

By far the most important legislation, as far as day-to-day practice in Ontario is concerned, is the Health Disciplines Act, 1974, and the Health Insurance Act, 1972.

The medicine section of the Health Disciplines Act really does two important things. First it sets a limitation period on malpractice actions in respect of professional services rendered by physicians of 'one year from the date when the person commencing the action knew or ought to have known the fact or facts upon which he alleges negligence or malpractice.' Second, the Act defines the powers of the College of Physicians and Surgeons of Ontario, the regulatory body of the medical profession. All doctors must be members of the College and abide by its laws in order to practise in Ontario. Among the stated objects of the College in Section 46 are:

(2) (a) to regulate the practice of medicine and to govern its members
(b) to establish, maintain and develop standards of knowledge and skill among members
(c) to establish, maintain and develop standards of qualification and practice among members
(d) to establish, maintain and develop standards of professional ethics among members

In order to carry out the stated objects, the College is granted wide-ranging powers, both legislative and judicial.

The legislation made by the College and subject to the approval of the Minister of Health is contained in the by-laws of the College as well as in Ontario Regulations 577/75 and 631/77. These important regulations detail the electoral districts for representatives to the College, requirements for licensing, standards of practice, and the requirements for inspection of books and records of members, in connection with their practice.

Powers of the College

The judicial powers of the College lie with its five committees:

1) Executive
2) Complaints
3) Discipline
4) Registration
5) Fitness to Practice

Contrary to public opinion, the purpose of the College is the protection of the patient rather than the doctor, and therefore the public, in the form of government appointees, is represented on all the above committees. The two committees a practising physician is likely to encounter are the Complaints and Discipline committees.

It is the duty of the Complaints Committee to consider and investigate written complaints made by members of the public or members of the College regarding the conduct or actions of any physician in the province. The committee may take action on its own or refer the matter to the Discipline Committee.

The Discipline Committee must hear and determine allegations of professional misconduct or incompetence against any member and assign any penalties. This committee is given the power under statute to: revoke or suspend a member's licence, impose restrictions on that licence, reprimand or fine a member up to $5000.00, or any combination of the above.

Where the Registrar of the College has reasonable grounds to suspect misconduct or incompetence, he may, with the approval of the Executive Committee, appoint one or more persons to make an investigation of the matter. These investigators, upon proper identification, are empowered to enter a physician's office at any reasonable time and examine, remove and copy any books, records, documents and things relevant to the subject matter of the investigation. Any interference on the part of the doctor can made him liable to a fine of up to $2000.00[24]

It is for this reason that a doctor who is unaware of his obligations under the regulations under the Health Disciplines Act, may find his first encounter with the College to be an unpleasant one.

Section 26 of the Regulations defines thirty-one types of professional misconduct. They range from the ridiculously detailed section on advertising one's services both in the newspaper and telephone directory, to the more serious areas dealing with sexual impropriety with a patient, fraud, billing practices, etc. In many of these definitions, professional misconduct overlaps with the law of contracts, tort law, and criminal law. Thus a physician violating one of these codes, could find himself facing multiple claims for the same mistake.

Section 27 of the Regulations, defines, in some detail, conflict of interest with respect to a vendor of medical appliances, drugs, materials, equipment or with respect to referrals and laboratory procedures. Section 28 deals with the requirements for medical records while Sections 29 to 38 state procedures for prescription and dispensing of medications.

A knowledge of the above twelve sections of the Regulations (26 to 38) is essential to a practising physician in this province and would take no more than twenty minutes to read.

Billing Practices

The final piece of legislation to be dealt with in this paper is the Health Insurance Act established in 1972 and amended in 1975, and the Ontario Regulation 323/72 under this act. As far as the physician is concerned, this act sets out billing practices to be followed and fees to be charged for services rendered (via the OMA fee schedule).

Basically, a doctor in Ontario has only two choices with respect to being paid a fee for service:

1) He can submit his claims directly to the Ontario Hospital Insurance Plan and be paid directly by the Plan to the amount of 90% of the Ontario Medical Association schedule of fees. If he bills this way, he must accept 90% as full payment, and the Plan deducts the 10% from the amount billed on the ground that this represents the amount which the physician would otherwise pay to bill patients, to collect and document payments, and to cover bad debts. This choice is also known as being 'opted in' and currently 86% (as of September 1978) of Ontario doctors receive payment this way.

2) If a physician does not like the above option, he may choose to bill the patient. In this case, he must inform the Manager of the Plan, in writing, of his intentions at least three months in advance. He must continue to send in claim forms to the Plan, but he can now bill the patient directly for up to 100% of the OMA fee schedule, of if he and the patient have agreed before the procedure is carried out, an even higher fee may be charged. The Plan then reimburses the patient for 90% of the OMA fee schedule. Of course, in this case, the doctor assumes the expenses of billing, receiving payment and bad debts. This choice is what is known as being 'opted out.' It should almost go without saying that a patient is under no obligation to stay with a doctor who has opted out and this is possibly one of the main reasons for the relatively small number of doctors who have chosen to do so.

As stated above, regardless of whether a physician is opted in or out, he must still submit claim forms to the Plan. This information is fed into the OHIP computers and with some simple programming, a profile of the billing practices of any individual doctor can be compared to his peers within his specialty and geographical area, to look for discrepancies and inconsistencies. If the doctor in question is felt to have been less than responsible in his billings, the matter can be referred to the Medical Review Committee who may recommend refusal or recovery of payment for the following reasons:

(a) all or part of the insured services were not in fact rendered,
(b) all or part of such services were not medically necessary,
(c) all or part of such services were not provided in accordance with accepted professional standards practice,
(d) the nature of the services is misrepresented.[25]

Where a dispute arises whether or not a particular service was medically necessary, the matter is referred to the Medical Eligibility Committee for consideration and decision. In any case where refusal or recovery of payment occurs, the physician must be given reasons **in writing** and allowed fifteen days to appeal to the Health Services Appeal Board, which can reverse previous decisions.

In the case of an 'opted out' doctor, refusal of the Plan to reimburse the patient for any of the above reasons, absolves him of the responsibility to pay that amount to the doctor, for the services in question.[26]

Finally, Section 49 of Ontario Regulation 323/72 under the Act, lists services which are not insured services under the Plan. Among them are cosmetic surgery, expenses for travelling time and mileage, preparation for a testimony in court, advice by telephone, examinations performed for employers, insurance companies, schools or the courts, simple laboratory procedures carried out by a physician for the purpose of diagnosis or treatment (i.e. urinalysis),[27] services not medically required, acupuncture, genetic counselling, group psychotherapy after 7th hour per day, and interviews with self-help organizations on behalf of a patient.

Traditionally, doctors have

performed many of the above services for nothing. However, recent economic trends have made it difficult, if not impossible, to continue to do so any longer. Many doctors simply refuse to do them, while others charge patients individual fees for the services. A relatively new innovation in this area has been the charging of a yearly 'membership fee' to patients to cover these expenses for the year. But in this situation, the doctor must be careful to explain what exactly the fee is for and then must be available and prepared to fulfil his end of the bargain. Charging for these uninsured services has probably been a major factor in the decline of the doctor's esteem in the eyes of the public recently. However, at this point in time, it seems unavoidable.

Up to now, this paper has dealt with specific areas of the law important to the physician. Two glaringly absent topics however have been euthansia and artificial insemination, mainly because no area of law specificaly deals with them. With the exception of a handful of well-publicized American trials, the decision regarding euthanasia still lies mainly on the shoulders of the individual doctor. The only principle to remember is that it is illegal to take **active** steps to shorten a life, but passive measures such as withdrawal or withholding of treatment seem to be more acceptable. In this regard, though, the College of Physicians and Surgeons and the Canadian Medical Protective Association have both stated flatly that 'no resuscitation' orders should never be written on a chart in advance of such a situation. On the other hand, both the Canadian Medical Association and the Ontario Medical Association have gone on record as labelling such an order 'appropriate and ethically acceptable' under certain conditions.[28]

Conclusions

Even if all precautions are implemented, and the letter of the law memorized, the doctor's best protection against litigation or discipline is quite limited if he fails to heed one important doctrine; that is the maintainance of a good relationship with his patients. Physicians are, after all, human and are bound to make mistakes sometime during their career. If his patients are happy with his service and the doctor is honest about his errors, it is surprising how often his mistakes will be forgiven. On the other hand, a patient who is unhappy with his physician, will watch very carefully and seize upon any error made to make his feelings known. The key is good communication.

It is well to remember that the doctor is never the winner in any action or disciplinary procedure. On the economic side, he is not paid for his time in preparing reports and actually appearing in court or before a tribunal. With the increasing use of legal aid in this province, even if the doctor is absolved of any guilt or civil liabilities, he must in many cases still pay all of his own legal costs. But the highest costs, by far, stem from the damage done to his reputation and the emotional strain generated by the often lengthy and drawn out procedures.

The importance of learning these 'preventative' aspects of medicine, particularly the laws that affect us as practitioners, cannot be over-emphasized. it is a topic that is sadly neglected in our curriculum in Ontario. Thus the onus must lie with the individual to learn on his or her own. The price paid now is only a small portion of our time. Later the price for not knowing can be much higher - both financially and emotionally.

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William Hewson: Medical Scientist

Robert Hegele 8T1

The late Eighteenth and early Nineteenth Centuries in Europe represented an age of great revolution in physiology and medicine. It was so great that it has shaped the attitudes and approach towards medical theory and practice today. Before this period of change, Western Man generally regarded life as a mystical, abstruse quality, granted to lifeless matter by an all-powerful divinity. Society's doctors practised from a basis of old and established principles which did little to alleviate changes in the physical state of people. As late as 1800, long used (and misused) treatments such as blood-letting were in standard use for many ailments in Europe. Simply put, physiological theory and medical practice had not advanced to the same extent as, for example, the physical sciences during this Age of Enlightenment. Analysis of life and improvement of disease conditions based on experimentation, observation and quantification was as foreign to medical people then, as the concept of treatment of disease by the Eastern medical arts is to North American doctors today.

Slowly, the realization came that instead of philosophizing about life as a mixture of abstract forces and principles, it was necessary to formulate concrete systems and working theories regarding life, with underlying observations and experimentation. Thus, the art of medicine could progress as a scientific means of defining the normal and of treating the pathological. This was a new way of approaching medicine and physiology. As a result, it took a relatively long time

for it to be accepted as the basis for attaining physiological knowledge.

The subject of this article is William Hewson, a medical practitioner and physiologist in Britain during the beginning of this period of change. He is not typical of his contemporaries, because at that time his techniques of rigorous, controlled physiological experimentation were not widely practised. He is interesting in that through his experiments, he made important observations and formulated hypotheses, which were verified up to a century later, when the scientific method and physiology were married and happily settled down. The quality of his experiments allowed him to overturn existing beliefs and his conclusions greatly advanced physiological knowledge. Yet, he has been overlooked as a major physiologist and much of his work has wrongly been attributed to others, or forgotten.

Educational Background

William Hewson was born in 1739 in Hexham, Northumberland. His father was a doctor, which was an advantage to gaining admittance to medical facilities in those days (academic achievements were largely ignored). After completing his training at the age of twenty one, he arrived in London for practical experience. There, he entered a private teaching facility run by William Hunter (a physician to the Royal family). Hewson was first an anatomy demonstrator for a group of forty students and did excellent teaching and dissection. Hunter then offered Hewson a full partnership in his practice provided that Hewson study in Edinburgh under William Cullen for one year, which Hewson did.

William Cullen (1710-90) is a major figure in the history of British Science. While active in the field of chemistry, his connection with Hewson's life and work is through his interest in physiology. Cullen devoted a great deal of time to observation and classification of various diseases and other physiological phenomena. He believed that observation and then grouping the data consistently was of utmost importance for imposing order on a large body of quantitative results. This was perfected over his life-long experience in science. While it seems to be an obvious way of conducting research today, it was not typical of the generally relaxed manner of

physiological experimentation of that time. What Hewson took away from Scotland at the end of that year was the realization that careful empiricism and then implementation of some rational structure on date obtained objectively was necessary to insure that any scientific investigation was meaningful.

Upon his return to London in 1761, Hewson established himself as the sole partner in Hunter's lucrative medical practice. It was during this period of his life that Hewson began to use his non-practising time to devise and perform experiments dealing with some of the most pressing physiological problems of his age. Among these was the function of the lymphatic system in man and whether or not it existed universally. It was generally regarded that the proof of its existence in other species of animals might shed some light on its possible functions in the human body. It was also realized that the first person to present irrevocable evidence of observation and knowledge of the function of lymphatics in animals and man would significantly advance the existing knowledge of this system.

Lymphatic vessels of the lower extremity. Hewson pioneered the study of the lymphatic system.

Rise to Notoriety

In William Hunter's laboratory, Hewson and Hunter were able to prove by careful mercurial injection, that lymphatics definitely opened into the intestines. They also showed that lymphatics were not a continuation of the arterial system as was believed and that they were capable of absorbing at least some types of material. Hewson realized that before further speculation could occur he would have to prove the existence of the lymphatic system in other forms of life. This would establish its role as a system essential to life.

With skillful dissection techniques, elimination of unnecessary qualitative variation, astute observation, detailed diagrams and articulate reporting of his experimental results, Hewson, after several years of work, became the first scientist in Europe to publish the discovery of the lymphatics in several diverse species of animals and reptiles. His discoveries gave a strong impetus to the intensification of the further study of the lymphatic system in humans.

Hewson submitted his paper on the lymphatic system in birds, reptiles, amphibians and in man to the Royal Society (the institution of the scientific elite in England). The paper aroused such interest that he was immediately inducted into the Society (one of the youngest Fellows ever, at age thirty) in 1769. He also won England's highest scientific honour, the Royal Society's Copely medal as "the man who had contributed the most to the advancement of science and useful knowledge in England" in the same year.

Hewson and Ben Franklin

After becoming a Fellow of the Royal Society, Hewson made substantial professional gains as well as establishing many personal contacts in the world of British Science. The most notable of these was Benjamin Franklin (1706-1790) who was also a Fellow of the Royal Society as well as the American ambassador to London in this period before the American Revolution. While Franklin is remembered today as a politician and the source of many trite aphorisims, he was important as a scientific figure. He was one of the first strict experimentalists in the History of Science. An examination of his experiments on electricity shows his obsession with incorporating the scientific method of hypothesis, observation and tentative conclusions leading to further hypothesis, etc... They are all simple, elegant, informative, controlled, reproducible and directly related to confirming (or denying) the underlying hypothesis. Due to Franklin's notoriety at the time, they received extensive exposure in Europe and America and actually became models for future experimentation in other fields.

Because of Hewson's close friendship with Franklin (Franklin was best man at Hewson's wedding), along with their interest in each other's work science, politics, and academics in general, the American statesman had a profound influence on Hewson's experimental method and its application to physiological problems. Comparison of a typical experiment by Hewson to one by Franklin bears out this structural and stylistic similarity.

The next five years were the most productive for Hewson. From 1770 to 1774 Hewson published a total of eight papers in the *"Philosophical Transactions"* of the Royal Society (the official "scientific journal" of that institution). This output was remarkable then and is so even by today's standards. Each paper described a set of simple, well-designed experiments, which the reader was encouraged to perform. Following the method and observation section, was a brief commentary on the importance of the results and their relationship to the state of physiological knowledge at the time. The structure of these later experiments undeniably follows the pattern set out by Franklin, showing Franklin's influence on Hewson.

Hewson's complete works were not published until 60 years after his death and they filled three books. The *"Experimental Enquiries"* of William Hewson can be conveniently divided into three sections: his early work on the lymphatic system (1765-70) his work on blood coagulation (1770-72) and his studies of the red particles of the blood (1772-74). It is also convenient to discuss them in this order.

New Findings on the Lymphatic System

After demonstrating the presence of the lymphatic system in many higher life forms, Hewson gave himself the licence to concentrate his efforts on analysing lymphatics in man as an essential system. In 1774 he published *"A Description of the Lymphatic System in the Human Subject"*. This was a compilation of his earlier research and in it Hewson came to several important and prophetic conclusions. First, he definitively demonstrated, by injections on recently deceased subjects, that the lymphatic system was able to absorb excess fluidity from various bodily tissues. His strong evidence came from a wide range of experiments which exhibit careful preparation, execution and observation. He noted that there was no lymphatic uptake of external fluid from tissues if the lymphatics were obstructed. He traced the absorption of "venereal posion" (now known as *T. Pallidum* in primary syphilis) through the lymphatic vessels and their localization in the nodes, which became hard and inflamed (today called "inguinal lymphadenopathy"). He noticed that the "venereal poison" could possibly spread through the lymphatic system to caused widely distributed inflammatory lesions on face and hands (today recognized as sites of lesions characteristic of "secondary syphilis").

Hewson was the first to describe cancerous metastasis by showing that the "cancerous poison" was able to spread through lymphatics (this is a remarkably visionary conclusion). In addition to this, he concluded from his studies that the "intestinal lacteals" and lymphatics were part of the same system, somehow involved in dissemination of nutritive products within the body. This was proven true many years later and indeed is regarded as a fact in today's concept of digestion of fats. Finally, Hewson was able to link edema to lymphatic obstruction by tying off the lymphatics in cadavers and injecting fluids through local arteries. He was the first to report this connection between blockage of lymphatics and edema.

Important Work on Blood Coagulation

While Hewson's early success and rise to notability were a result of his work on the lymphatic system, his greatest achievements were in the area of research on the blood. His thirty-three published experiments on blood coagulation are truly excellent models of what today are called *"controlled experiments"*, and show Franklin's influence on Hewson throughout. The prevalent concept in Hewson's time was that blood, like water, was a fluid, and like water, it would solidify at a low temperature. This conclusion was based on hypothesis and analysis rather than empirical verification. Hewson questioned this by first pointing out that animals which hibernated through the cold winter months showed absolutely no signs of increased coagulation. Through the use of carefully structured experiments he demonstrated that blood from many species of animals including man was actually delayed in its clotting by cold temperature. In fact, he discovered that warmth hastened clotting time *in vitro* (114°F - 12 minutes; 125°F - 11 minutes; 160°F - 4 minutes). He found that he could freeze the blood, then thaw it out and coagulation would continue, indicating that freezing and coagulation were mutually exclusive processes.

By far Hewson's most important finding in the area of blood coagulation, was that of a "coagulable lymph" in the blood (today known as the clotting factor fibrinogen). At this time, there was no concept of proteins, hormones,

mediators or any physiologically active, chemically identifiable substances within the body. Clotting of blood was regarded as a change of state of the serum (from liquid to solid) after exposure to cold and air. Hewson destroyed this view. First, he was able to separate the blood, gravitationally, into a coagulable plasma and red corpuscles. Then he separated his"coaguable lymph" from the plasma by agitation and "drawing off" (today recognized as removing plasma proteins from the serum). He observed that without this "lymph", coagulation could not occur. He was the first to demonstrate that this "coagulable lymph" (his way of looking at fibrinogen and other plasma proteins) could exist independently of other parts of the blood, and contained a factor or factors, which were responsible for clotting. This can be regarded as the first step towards the multi-factor concept of blood coagulation which we have today.

Unfortunately, this work was overlooked by Hewson's contemporaries. It was not until some 80 years later that the German physiologist Muller came to the same conclusions as Hewson, using virtually the same experiments.

A New View of Blood Cells

Finally, Hewson's most interesting research was on the "red corpuscles" of the blood (the concept of a "cell" as we know it was several generations in the future.) Hewson was extremely competent in the use of the microscope of his era, and was, by manipulation of lenses, able to achieve magnifications of up to four hundred times. With his microscope and without the use of stains, smear techniques, preservatives or fixation, he began to examine and draw the "red corpuscles", and his discoveries shattered the prevailing theories of Leeuwenhoek. First, Leeuwenhoek said that the size of the red blood particles was directly related to the size of the species of animal in which they were found. Hewson unequivocally proved this to be incorrect by doing extensive measurements on hundreds of animal "red particles". Second, the "red particles" in man had been thought of as spherical globules, "like marbles" as described by Leeuwenhoek. This was a result of always diluting the sample with water to separate the "globules" and then observing them. Hewson added serum to his samples, thereby "maintaining the particles in a familiar environment" while "making them distinct from each other to view". He goes to say:

> "In these experiments, I found that these particles were as flat as a guinea."

and even observed shadows cast on the centre of the particles due to their biconcave shape. He noted that adding water to the serum caused the particles to balloon out and finally to rupture (hemolysis). He also noticed that a salt solution exerted the same preserving property on red blood cells as pure serum. These were all "firsts" in the history of physiology but were slow in gaining general acceptance due to the weight carried by Leeuwenhoek's name. As chemistry, biology and microscopy improved, Hewson's findings were independently validated by many other physiologists and his initial discovery of them was largely forgotten.

Finally, Hewson saw, without the aid of stains, the cells of the thymus of an infant and the cells of the Bursa of Fabricius in birds. His description of them was one of the first independent observations and classifications of a new cell type, today known as the lymphocyte.

Enthused by his findings, but disappointed in the lack of interest in his papers, Hewson began an intensive study of the spleen as a potential hemopoietic organ. Unfortunately he contracted septic fever during a cadaver dissection and died shortly thereafter. He was thirty-four.

The chest of a stillborn child opened to show the thymus gland. From these studies, Hewson visualized lymphocytes.

Conclusions

As should be obvious, the bulk of Hewson's work was observational and descriptive. This freed him from devoting his time to complex, abstract and largely unverifiable philosophies of life and its mechanisms. His divorce from the mainstream of physiology during this time allowed him to actively design and carry out useful experiments. These can be regarded essentially as forerunners to the experiments in physiology performed today. By regarding life as something which

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Histoplasmosis and the Health Field Concept

Jennyfer Simpson 8T1

Traditionally, the fungal disease histoplasmosis has been of particular interest in the differential diagnosis of pulmonary tuberculosis; however, in specific endemic regions histoplasmosis is a potential hazard with significant morbidity.

The purpose of this paper is to study histoplasmosis within the framework of the Health Field Concept (Lalonde 1974).

A brief outline of the history and development of histoplasmosis as a public health problem will begin the paper. A review of the pathogenesis and the clinical manifestations of histoplasmosis and a discussion of histoplasmosis within the Health Field Concept will follow. Recommendations for future plans to achieve increased prevention and diagnosis of histoplasmosis and the implications of the Health Field Concept will conclude the paper.

To promote clear understanding in a discussion of histoplasmosis, two terms arise which must be defined; these are endemic and epidemic. Endemic is defined as:

1. present in a community at all times, but occurring in only small numbers of cases
2. a disease of low morbidity that is constantly present in a human community. (Miller and Keane 1972:317)

In relation to histoplasmosis, epidemic refers 'not to an epidemic spread but to cases of histoplasmosis in a group of persons having a common exposure' (Emmons 1955:633).

History and Development of Histoplasmosis

Histoplasmosis was first recognized and reported in Panama in 1906 by Darling, who named the fungus *Histoplasma capsulatum* in the mistaken belief that it was a protozoan. Da Rocha-Lima corrected this error when he expressed his belief that *Histoplasma* was not a protozoan but a fungus. But not until De Monbreun isolated this organism in 1934 was its mycotic nature definitely established. De Monbreun's 1934 studies were so carefully done and complete that there have been no basic changes in his description of the dimorphic *H. capsulatum*. Up to 1937 only thirteen cases of histoplasmosis had been recognized in the United States. At this time, histoplasmosis was considered to be a disease of little significance; it was felt to be a rare generalized infection involving the reticuloendothelial system which was always fatal.

In 1941, histoplasmin as a skin test antigen in man was first used.

Research at Vanderbilt University and at John Hopkins proved the existence of a benign subclinical form of histoplasmosis and revealed marked geographic variations in the prevalence of pulmonary calcifications in tuberculin non-reactors and differences in skin sensitivity to histoplasmin.

In 1947, the first serological method of diagnosis — the complement fixation test — was developed.

In 1948, Furcolow uncovered a large number of histoplasmosis cases in a tuberculosis sanitorium and noted the confusion between histoplasmosis and tuberculosis. An article by Stewart (1949) reported that up to that time no cases of histoplasmosis had been reported in Canada.

Focal outbreaks of histoplasmosis 'epidemics' became associated with soil around chicken houses and with bat and pigeon excreta (Chin et al. 1970, Emmons 1961). The epidemic pattern was seen as recurrent, with exposure to spore-containing dust, mild to severe widespread pulmonary disease, followed generally by recovery and often calcification in the pulmonary lesions; very few deaths were reported. Thus, histoplasmosis had outgrown its status as a rare, uniformly fatal disease of little concern to American physicians.

In 1954, Straub proved that histoplasmosis in the overwhelming majority of cases was a primary pulmonary disease. He also showed that despite the benign character of the primary infection, it is regularly accompanied by blood stream dissemination of the organism (Sweany 1960).

It has recently been shown (Youmans et al. 1975) that progressive histoplasmosis probably occurs in a host with some other disease or abnormality, or a defect of immunologic response, in particular, cellular immunity.

Pathogenesis of Histoplasmosis

Histoplasmosis is caused by the dimorphic fungus, *Histoplasma capsulatum*, which grows in soil enriched by the fecal matter of chickens, starlings, other birds, and bats. Infection usually occurs by inhalation of aerosolized spores. After inhalation it is thought that the spores are phagocytosed by alveolar macrophages. Within the macrophages, the spores develop into parasitic yeast cells and localized multiplication occurs. In the normal host a cell-mediated immune response occurs resulting in death or cicatrization of the intracellular yeast; pulmonary lesions become fibrotic and calcified.

An early dissemination of the yeast cells by way of the lymphatics and blood may occur but is usually checked through phagocytosis by reticuloendothelial cells. However, if cell mediated immunity fails a progressive proliferation of the yeast cells may occur with profound dissemination throughout the reticuloendothelial system.

Clinical Manifestations

Several distinctive clinical forms of histoplasmosis are recognized (Fudenberg et al. 1978):

Primary Histoplasmosis: Primary histoplasmosis is usually asymptomatic; however, after heavy exposures it may cause 'flu-like' symptoms (fever, cough, malaise). Detection of the disease is in retrospect through a positive reaction after a histoplasmin skin test. In general, recovery is spontaneous; multiple, small occasionally calcified pulmonary lesions may be seen on x-ray.

Acute Disseminated Histoplasmosis: If histoplasma dissemination has not been contained after the initial infection, acute disseminated histoplasmosis may occur. This acute dissemination is most frequently seen in children and is characterized by fever, hepatosplenomegaly, anemia and leukopenia. Without treatment it is usually fatal.

Acute Reactivation Histoplasmosis: Mild reexposure and reinfection are generally asymptomatic when the individual's immune mechanisms are sufficient to cope with the infection. After massive reexposure in individuals with cell-mediated immunity to histoplasma, a severe pulmonary inflammatory response may occur. Radiologically, fine pulmonary nodulation characteristic of a miliary type granulomatosis may be seen. Acute reinfection histoplasmosis is usually, but not always, self-limited and is related more to host hypersensitivity than to fungal invasiveness.

Chronic Pulmonary Histoplasmosis: Clinically and radiologically, this form resembles chronic pulmonary tuberculosis. The disease is most commonly found in middle-aged males with underlying chronic obstructive pulmonary disease who probably undergo recurrent exposure to *H. capsulatum*.

In chronic pulmonary histoplasmosis the infection is localized in the lung, with no extrapulmonary dissemination. The disease appears to persist because of any underlying pulmonary anatomical defect and perhaps an abnormally increased immune response; it does not disseminate because of adequate cellular immunity.

Chronic Disseminated Histoplasmosis: Chronic disseminated histoplasmosis is not common but does occur in individuals with defective cell-mediated immunity. This form of the disease reflects a generalized histoplasma invasion of the reticuloendothelial system manifested by fever, anemia, leukopenia, hepatosplenomegaly, lymphadenopathy and wasting. Adrenal gland invasion and destruction is the most serious (and not uncommon) complication.

Diagnosis

The best and most absolute method of diagnosis is to culture *H. capsulatum* from tissue or exudates of the infected individual. Serologic tests, especially the complement-fixation reaction, are also useful in diagnosis. However, interpretation of these tests is not clear-cut and requires careful consideration of possible influencing factors. The histoplasmin skin test, for example, may stimulate the immune system and increase antibody levels in the serum; these increased levels of antibody seriously affect the interpretation of serologic tests and may cause artifactual elevation. In using serologic tests, it is the presence of a rising circulating antibody titer which most strongly indicates the presence of an active disease process.

The intradermal histoplasmin test for hypersensitivity should not be done prior to serologic testing and should not be used in trying to make a diagnosis of histoplasmosis. It is so frequently positive in endemic areas that it may reflect present infection or disease, or past infection or disease. Negative tests are not uncommon in adults with active histoplasmosis. Another problem with the histoplasmin test is that cross reactions are common in individuals suffering from other fungal infections and thus is quite nonspecific.

Treatment

Amphotericin B is the only drug at present which is effective in treating histoplasmosis. Because of its high toxicity, prolonged treatment with Amphotericin B is used only in individuals with disseminated histoplasmosis. Its use in the less severe forms of the disease is restricted due to the self-limited nature of these forms.

Prognosis: In acute pulmonary histoplasmosis the prognosis for spontaneous recovery is excellent; however, individuals with chronic cavitary pulmonary histoplasmosis are prone to relapse even after treatment with Amphotericin B. In the absence of Amphotericin B, disseminated histoplasmosis is fatal in more than 80% of cases (Fudenberg et al. 1978).

In the United States it is estimated that about thirty million people have been infected with *H. capsulatum* and about one-half million people acquire the infection each year (Chin et al. 1970). Because the endemic regions of histoplasmosis in the United States are much larger than those in Canada, the American statistics can not be applied in the usual proportional manner. However, these statistics do illustrate the prevalence of histoplasmosis to a certain extent.

Histoplasmosis has its highest endemicity in areas drained by the Mississippi River and its tributaries (Chin et al. 1970). In Canada the disease occurs as an extension of the American endemic focus. Epidemiological studies in Canada (Lenzoff et al. 1964, Jessamine et al. 1966, Handzel and Jessamine 1975, MacEachern and McDonald 1971) have identified the Niagara Peninsula, St. Lawrence and Ottawa valleys and Montreal's Mount Royal Park as endemic areas. These areas are sometimes referred to as the Grand Trunk Corridor (Bell 1976). Here climatic and soil conditions are favorable for the development of *H. capsulatum*. Manitoba, the Maritime provinces, British Columbia and northern Quebec seem to have quite a low rate of infection (Jessamine et al. 1966, Guy et al. 1949, Stewart 1949).

At present, although the specific endemic areas outlined above are known, very little is being done. Control measures are few, being left to the local government health agency, and probably only occurring after there has been an outbreak, or if the hazard has been recognized" (Jessamine 1976 — in correspondence with the writer).

Application to the Health Field Concept

The **Health Field Concept** provides a very suitable framework for examining histoplasmosis. Various aspects of histoplasmosis can be traced to each of the four elements of the health field.

Human Biology: It has already been noted that the progressive disease forms of histoplasmosis, i.e., childhood infection, disseminated histoplasmosis in the adult and chronic pulmonary histoplasmosis, occur in individuals with faulty or incompletely developed immunological mechanisms or in those with underlying chronic obstructive pulmonary disease. The progressive disease forms, although they do not occur as frequently as the usual benign infections, do compose a serious threat to an affected individual's health.

Environment: The Grand Trunk Corridor contains a high concentration of intensive poultry product operations. Due to the limited amount of land available for the disposal of the poultry manure, large amounts of highly nitrogenous organic matter have been applied to the soil. Decomposing nitrogenous organic matter, especially chicken manure, produces conditions in the soil conducive to the development of *H. capsulatum*. Infection results from inhalation of spores of the fungus released into the air from localized foci rich in decomposing droppings of chickens, other birds and bats (Bell 1976).

Although histoplasmosis may be thought of as a disease related to exposure of the spores in rural areas, there are important urban sources of exposure, for example, soil under trees used by starlings as roosting shelters (Davies and Jessamine 1975).

Lifestyle: Clinical data indicates that poultry-farm operators in the Grand Trunk Corridor constitute the largest occupational group contracting histoplasmosis. The data collected by Jessamine et al. (1966) suggests that poultry farmers and their employees are working under increasing high-risk conditions with the continued application of manure at high rates to the soil. Histoplasmosis is also a hazard of construction workers (Bell 1976). Biologists exposed to *H. capsulatum* in bat infested caves concur occupational hazard (Handzel and Jessamine 1975).

Health Care Organization: Histoplasmosis as a differential diagnosis in pulmonary "viral pneumonia" type diseases has often been ignored by or unknown to physicians. In the past, many individuals with histoplasmosis have been misdiagnosed as having tuberculosis, and have been treated as such (Sweany 1960). Although in most cases there is no clinical illness, it is the responsibility of health care professionals to be alert for cases or progressive histoplasmosis. A clue in diagnosis should lie in geography. Individuals who live in highly endemic areas or who have visited endemic areas should always be tested for histoplasmosis if presenting symptoms are appropriate. That people go misdiagnosed reflects a problem within the health care organization.

Future Implications

Histoplasmosis is a potential hazard; while highly infected foci within endemic areas may be small, inadequate precautions can result in serious epidemics (Leznoff et al. 1969, Loosli et al. 1954, Roueche 1960). Also increased travel and population migration make histoplasmosis a diagnostic consideration by physicians anywhere on the North American continent.

To determine the prevalence and incidence of the infection, a program of histoplasmin skin testing might be considered, especially in and around currently known and/or suspected endemic areas. For such an epidemiological vendeavor, soil sampling for *H. capsulatum* is not suitable, being wasteful and inefficient in regards to cost, time and the lack of available facilities for soil culturing.

Amphotericin B, the currently recommended treatment of histoplasmosis is not completely satisfactory due to the serious side effects. Future research for more acceptable drugs may profit the treatment of histoplasmosis.

Recommendations

Lalonde (1974:29) states that "regional health authorities with the power to plan and manage the health care requirements of a given geographical area are needed". This is of significant importance in relation to histoplasmosis because of the specific endemic regions which have unique needs. Regional power would allow for regional programs to meet specific regional needs.

Several specific measures for the promotion of the prevention of histoplasmosis have been suggested. One of these measures in the decontamination of soil infected with *H. capsulatum*. As a general rule, all soil microorganisms are controlled by their environmental conditions (Goodman and Larsh 1967). Unfortunately, at present, there are no good methods for the decontamination of the large regions of soil involved in endemic areas of histoplasmosis. In small, urban areas, fecally contaminated soil due to starling roosts may be disinfected

with a formalin solution (Davies and Jessamine, 1975). Pentachorophenol may also be used for small areas of infected soil, but is expensive and results in serious disruption of the soil ecosystem. Capping infected soil with six to eight inches of clay or shale soil provides a great reduction in contamination but is impractical for the large areas of land involved in endemic regions (Bell, 1976).

Reformed agricultural practices could promote prevention. It would be beneficial to bury manure at a depth below that of normal cultivation. Nutrients would remian available for vegetation, but *H. capsulatum* would lose a suitable environment for growth since its development is mainly restricted to the top five cm. of infected soils (Bell 1976).

A second measure to aid prevention would be the development of a vaccine to raise the level of resistance in high-risk populaions. Since histoplasmosis in the person with correct immunological mechanisms does not carry much risk, prevention in the form of vaccination should probably be limited to attempts to raise the resistance of the immunolgically compromised person or of those individuals with known pulmonary or other defects that might lower resistance (Youmans et al. 1975).

A third measure to promote prevention is avoidance of those places having high concentrations of fowl or bat excreta. However, because there are so many areas of unknown infection avoidance is difficult, especially in rural areas. It would be beneficial for farmers or others cleaning or tearing down chicken coops to minimize exposure by spraying the chicken coop and surrounding soil with water or a disinfectant to reduce dusts.

Masks should be worn by individuals in high risk situations. The poultry industry should promote, through education of employees of specific companies or of independent farmers, the wearing of masks to provide protection during the cultivation or handling of heavily-manured soils (Bell 1976). In general, farm buildings should be kept as clean and dry as possible.

Lalonde (1974:66) states that one of the broad objectives of the Government of Canada is "to reduce mental and physical health hazards for those parts of the Canadian population whose risks are high". This applies directly to histoplasmosis. A few of the general strategies proposed by Lalonde will be applied to histoplasmosis.

In endemic areas, health education programs by health professionals and school teachers should be provided. "Direct awareness activities" (Lalonde 1974:67) for the reduction of environmental health risks should be carried out by governments, business, communities in general, and health care professions. In endemic histoplasmosis regions, local government and health officials should attempt to educate high risk individuals such as farmers as to the dangers involved in continued exposure to fecally contaminated soil and the measures that these individuals can take to reduce such exposures. Poultry industries, in particular, should provide educational programs for their employees, as well as environmental controls of soil contamination by fowl excreta. It might be possible for the government to exert control over the accumulation of fowl, other birds, and bat excreta in focal areas by providing clean-up or primary prevention programs.

Public Health professionals - doctors and nurses - in endemic areas should become actively involved in educating the general public about the prevalence of histoplasmosis, and measures which can be taken to aid prevention of the disease. Physicians in endemic areas should observe for possible cases of histoplasmosis and consider the possibility of histoplasmosis as a differential diagnosis in primary pulmonary disorders. Medical schools and government health agencies should also stress the importance of considering histoplasmosis especially with primary pulmonary disease and negative tuberculin reactors.

Is it likely that the measures outlined above, which would hopefully lead to a decreased incidence of histoplasmosis, will be employed? The answer is, probably not. The gravity of the problem of histoplasmosis, in comparison to other current health problems such as cancer, alcoholism etc., does not warrant such involvement. Effective, measurable solutions are not available: morbidity statsitics of histoplasmosis are almost non-existent in Canada. Very little can be done in the form of control measures by either federal or provincial authorities as there is no notification procedure for the disease. And, of course, the cost involved in implementing the above suggested measures to promote prevention is too great in relation to the derived benefits.

Summary

Histoplasmosis is an infectious disease of significant morbidity and specific regional concern. The Health Field Concept was used as a framework for the investigation of histoplasmosis as a public health problem and several recommendations in relation to minimizing the threat of histoplasmosis in endemic areas were made. □

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A New Perspective on Chronic Disease

Doug Sinclair 8T0

The "Magic Bullet"

Smallpox, diphtheria, tetanus, polio—diseases made rare and less terrifying because of immunization. Here is proof of the triumph of medicine through the acquisition of centuries of scientific knowledge.

The problems of diagnosis and treatment of infectious disease were recognized in ancient times with Hippocrates' description of fever. Later physicians treated "like with like", in for example, the treatment of jaundice with various yellow plant extracts, or seeking some balance of body "humours".

The modern approach to disease originated in the work of Koch and Pasteur in the mid seventeenth century with the development of the "germ theory" of disease, whereby illness was caused by a specific bacteria or "germ".

> They imposed upon medical thought; they transfixed its theoretical and philosophical corpus with the vivid concept of the specific etiologic factor, and by necessity also with its corollary, the specific antidotal, curative agent, "the magic bullet".[1]

The germ theory represented a tremendous philosophical "leap", as Kierkegaard would call it, and formed a paradigm for medical therapy for the last two hundred years. The magic bullet formed the basic idea upon which modern therapeutics was constructed. Disease must have a cause, primarily some kind of invading organism, and medical science poured its energy into the search for causes and for magic bullets to cure these diseases.

The germ theory of Koch and Pasteur has gained widespread acceptance with appropriate remodelling and improvements. The theory is also a cornerstone of medical education and doctors are trained to accept it as fundamental knowledge. There is no period in the medical curriculum for question and discussion of the fundamental basis of disease and treatment.

Once a paradigm is established in science, great leaps forward are made. It is as if suddenly there is a structure upon which facts can be laid. Isolated observations can be correlated and new directions in research become apparent. The paradigm forms a new foundation. A system evolves into what Kuhn has called "normal science"[2] and the day to day business of scientific progress carries on, confident of its foundations.

Eventually, the paradigm cannot explain all the new observations that have arisen on its account, cracks begin to appear, and a scientific revolution occurs, at which point a new paradigm is substituted. During these times great turmoil occurs, where the roots of science are subjected to intensive scrutiny, until finally a new model emerges. The last great scientific revolution occurred at the beginning of the present century in physics, with the development of Relativity and Quantum Mechanics. We may have entered our next revolution—in medicine.

The "germ theory" cannot deal with the disease patterns that are apparent today. We attach more and more qualifications to the theory. Today we also include the effects of the environment and the psychological status of the patient, but we still believe in "germs". When a disease is said to have multifactorial causes, it means that there are many "germs", in the broadest sense of the word, causing the disease. We are not told that time and other complex interactions are marginal causes of disease.

Chronic Disease

The major modern diseases are unfortunately chronic diseases. They include heart disease, diabetes, cancer, and emphysema. They arise insidiously and kill slowly. At present, medicine cannot arrest the course of these diseases. "Magic bullets" or "germs" cannot be identified. "Risk factors" have been recognized and palliative therapy has been introduced, but a philosophical shift, both in research and in treatment, is necessary.

Chronic disease is defined as: "denoting a disease of slow progress and long continuance".[3] Chronic disease is not necessarily a disease of the aged. It is known, for instance, that twenty-five percent of the population between the ages of forty-five and sixty-four have arthritis and rheumatism and that thirteen percent have some form of heart disease.[4]

Our hospital system is designed for acute care, usually for less than ten days. But many of the diseases which are becoming more prevalent, such as heart disease, require long term management. The hospital system was not set up to deal with these problems. Once the acute manifestations have been managed,

the hospital has no choice but to discharge the patient. The chronically ill patient may then return to the family physician, who too often has only been trained in acute care. Patients cannot be followed properly. In medical school, one learns to treat disease after it appears, and not to adopt aggressive procedures to prevent chronic disease. A public policy is necessary to prevent and to treat chronic illness. This public policy must bring about a total awareness of chronic illness and not be limited to a specific chronic illness such as cancer or heart disease.

The Stress Theory

To approach the problem of chronic disease, it is necessary to study its etiology. The goal is to establish methods to treat whole populations to prevent the onset of chronic disease. The problems of the germ theory have been outlined previously, and it is apparent that a new etiological model is necessary for the study of chronic disease.

One of the most exciting developments in medicine in the last twenty years has been the understanding of the stress mechanism. Most people recognize the effect of mood and mental state on the body such as the appearance of headaches and muscle pain. The physiology of the "fight or flight" reaction has been known for some time. However, it is only recently, largely through the work of Hans Selye, that a comprehensive theory of stress has been assembled. These theories are beginning to show in detail how mental state and environmental factors affect physical well-being.

Stress is best defined in an engineering sense as "the resting force set up in a body as a result of an externally applied force". Physiologically it may appear in many forms. Stress can elicit anxiety or fear. It can be described as a state of apprehension and tension, but it need only be a small perturbation in the homeostasis of a person or organism.

The science of physiology has learned a great deal about the unity and wisdom of the body. The brain has access to an enormous amount of sensory information from the special senses, and the peripheral and visceral sensory systems. Effector neurons proceed from the central nervous system to every organ and blood vessel in the body. The endocrine system is being understood now in very complex terms. It reacts to a multitude of internal and external stimuli mediated through numerous pathways, including the cerebrum. It should come as no surprise that emotional and intellectual health are so closely related to physical health, as the necessary neuronal and endocrinological connections are all present. External influences on our organs should not be surprising either, as these have been explored in detail by psychology and physiology.

Functional Disorder

The advances of physiology and the evolution of the stress concept leave little room for the "functional disorder". A functional disorder is a condition with no morphological or anatomical explanation. David Dodge and Walter Martin have outlined a very interesting theory concerning the relationship of functional disorders to stress and chronic disease.

Their stress model of chronic illness consists of a few basic compartments. The best explanation is made in the form of the example of the gastric or duodenal ulcer. This disease is believed to begin in the "sociocultural environment"[5] which consists of various parts such as the level of technology, the urban way of life, and behavioural patterns in certain occupations that entail quick decision making with consequences overwhelming to the population or to the individual. These conditions of life introduce "socially induced stress" on many people in the population. The mechanics of this stress are obscure. Indeed, the words "socially induced stress" imply that the process is well understood when in fact this is not the case. The word stress is almost used in default. What is meant by the phrase is that a particular environment can in some complicated fashion cause acute and chronic physiological reactions in a person's body. The complexity of the mechanism can be shown by the extreme variation in the susceptibility of stress induced disease in the population and by the multiplicity of methods that have been developed by individuals to deal with their stress.

In the example of gastric ulcer, the response of some individuals to "social stress" would be excessive gastric acid secretion in the stomach. The mechanisms here are well understood. The gastrointestinal system often reflects the emotional state of the individual by changes in secretion and motility. The vagus and the sympathetic nerves provide a complicated innervation to the stomach and intestines. As many as eight intestinal hormones also modify gut activity and affect other organs such as the pancreas. Gastric acid secretion has been well studied experimentally.

The key to the stress theory of chronic illness is that socially induced stress causes a "functional disorder"; in this case increased gastric acid secretion. If the period of stress continues as a frequent occurrence, the response is labile at first, but later achieves sustained high levels. At this stage there is no pathology present. The functional disorder state can be thought of as an increased physiological response to a chronic stress state. The final stage of this progression is the chronic disease which does show anatomical changes. In patients with duodenal ulcers it has been found that they have on average more parietal (acid secreting) cells, and that they secrete more acid at rest, have a greater response to stimuli like histamine, and have less response to inhibitors.[6]

The importance of this theory is to illustrate the continuous number of states, from a purely mental (stress) state, through a functional disorder secretion state, to a chronic disease pathology state. The theory also shows the irony of modern medicine. A great deal is understood about the end stage chronic disease in duodenal ulcer, but there are many unknowns in the early stages; the very point at which it would be advisible to treat the patient to avoid the chronic disease. The danger of this theory is that it gives the impression that it is understood how stress causes chronic disease. This is not

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How Interesting Are You?

A.M. Summers 8T2

It is thought by many people that doctors, scientists, engineers, etc. are boors and bores, that we would be much more socially acceptable if we could discuss Dadaist painters, Sylvia Plath's madness, or some equally erudite topics. These people (one must assume that they are non-scientific people who have had our company foisted upon them) have been so vocal that consequently, universities, in recent years, have required their science students to take at least two non-science courses -a sort of de-Philistining process. Another consequence of the loud scorn of these people is that doctors, scientists, etc. have come to believe that they are boring, and show an inverted inferiority complex toward 'artsies', somewhat like the attitude of uneducated people toward academics.

Maybe it is time to examine exactly how boring doctors et al. are-and if we are boring, if it really matters.

At the outset, we must define boring. We generally measure the degree of dullness of someone or something by the response elicited in the boree — some of the characteristic responses being polite yawning, gentle snoring, a blank look, or, more blatant, the boree turning on his heel and walking away. The method of eliciting these responses according to our non-scientific critics, is to have little or no knowledge of art, music, literature, philosophy, etc. So, if we wished to construct a dullness scale using this criterion for dullness, we the doctors, scientists, and technologists would be at the top, i.e. the most dull or eliciting the most yawns, and the arts people would be at the bottom — the least dull, eliciting no yawns.

This is all very well, if we are willing to accept this criterion — which we seem to be willing to do as we all rush off buying tickets for the symphony, the theatre, and the ballet without even being sure if we like classical music, theatre or dance.

Instead of doing this, maybe we should construct our own dullness scale based on our own criteria. It is reasonable to assume that most people chose medicine or science because they were interested in one or the other — if they were after money or prestige, they could have just as easily become a lawyer or a stockbroker. The amount of dedication and single-mindedness required in most scientific and medical fields would also lead one to believe that these pursuits are the most interesting aspects of the lives of the people who follow them. Therefore, on our dullness scale, science and medicine should be at the bottom, and although cultural pursuits should not necessarily be at the top, they should come above scientific and medical ones.

In creating our own criteria for dullness, it may be said that we are once again showing our inverted inferiority complex. But before any judgments are made, we should look at why people think that we should know more about culture. In the case of doctors, which is what interests us, the main reason seems to be that doctors are becoming dehumanized, they are just shunting patients through in conveyor belt fashion. This may be so, but it is questionable that culture can rehumanize doctors, or anyone else for that matter. If we look at artists, musicians, writers, etc., do we find that these men and women are especially philadelphian and humanitarian? There have been great humanitarians among these artists, for example, Charles Dickens helped cause major social reform in nineteenth century England (although he did have a few personal anti-social quirks — such as child-beating), and Albert Schweitzer was a great musician. However, we seem to hear more often about the misanthropic practices of these people ranging from the notorious bad temper of Beethoven, through the cruel frivolities of Lord Byron or Guy de Maupassant, up to the Marquis de Sade whose nasty habits could be classed as severely deviationist (if one wished to be kind). Thus, it would seem that a person's ability to deal with people has little to do with learning, and that a touch of culture will not improve the way a doctor deals with his or her patients (unless, of course, the patient is an arts major). So, if erudition doesn't help us professionally, maybe it is only our social abilities that they are complaining about. This is a rather feeble complaint as people are gregarious, and it is doubtful that scientific people and artists meet socially very often. If they do, there are always neutral topics, like the weather, to be discussed.

In conclusion, it can be said that medical and scientific people are entirely too sensitive about their lack of culture. An 'in depth' knowledge of art, literature and music does not seem to be necessary to their professional competence, and although they may raise a few yawns from their non-scientific friends, they are not boring to their colleagues (with a few exceptions), with whom they probably mix socially.

It appears then, that we should display a little more self-confidence and only delve into culture if we enjoy it. □

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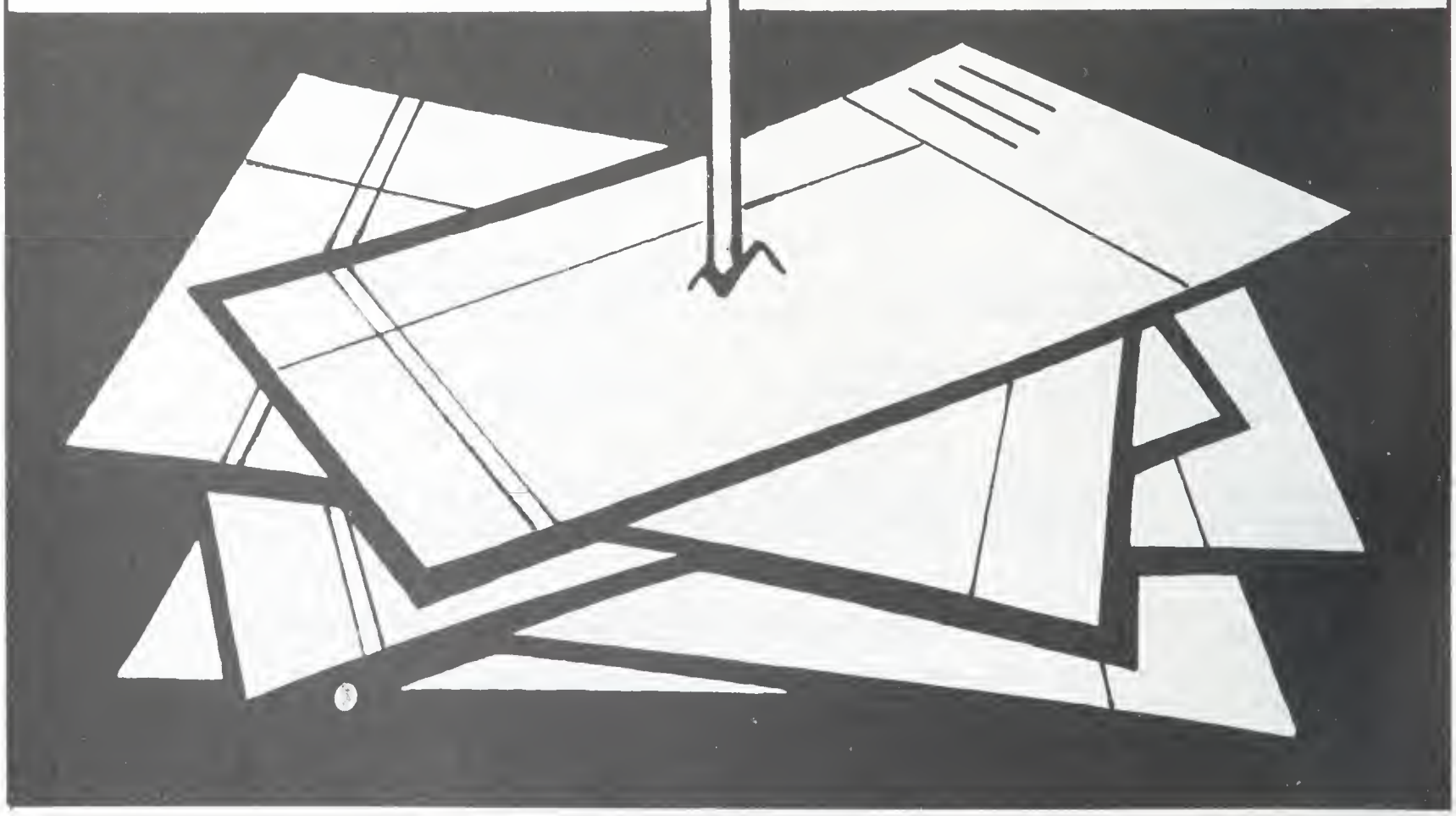

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true. There are enormous details and mechanisms which are completely unknown. But perhaps a new paradigm is developing.

The paradigm for stress induced illness does not stand on its own as did the germ theory of infectious disease. It exists within a broader context of disease. There is a need to think in terms of homeostasis — a concept discussed in physiology but often forgotten in the understanding of disease.

The body must balance the variabilty in the external environment with the rigid requirements of the internal body environment, both mental and physical. A conflict in maintaining this balance results in disease. Both microrganisms and stress fit into the scheme of disrupting the external/internal balance.

Microrganisms and stress interact between themselves and with the body to produce a disease state that would possibly not result if either of them had been present alone. (Admittedly a theoretical rather than a practical possibility.) This has been documented in the case of Tuberculosis. The Tubercle bacillus may be present, but the disease may not break out until the patient has some form of emotional upset.[7] From the other perspective, infectious disease can weaken a person physically which brings on mental stress, exacerbating the symptoms of disease.

A new theory of disease must look then at a continuum of responses of the body, aiming to balance the two environments in the face of a multitude of insults which can range from micro-organisms to vague, chronic mental stress. The theory must centre itself on the totally integrated human body.

The Treatment of Chronic Disease

There is an additional leap in understanding which must be made in the understanding of chronic disease. The stress concept must be extended from the individual to the population as a whole. It is of the utmost importance to extend the concept of stress into the field of epidemiology so as to define social conditions and their effects on populations. This principle is set forth by Dodge and Martin as a postulate:

> The incidence and prevalence of chronic disease in a population varies directly with the extent of socially induced stress in that population.[8]

Within the health care system, changes are necessary. There must be a significant re-design of the current acute care facilities to accommodate the chronically ill.

On an individual basis, a physician may advise a patient to stop smoking or to improve his diet, but there is not a comprehensive system of preventive medicine that addresses itself to the problem of chronic disease. To fill this need, many organizations have developed such as the Canadian Cancer Society, the Heart Fund and numerous organizations formed by the patients themselves. However, there is no 'Centre for Chronic Disease' comparable to the acute care medical centres that exist in all large Canadian cities. In "A New Perspective on the Health of Canadians", Marc Lalonde has outlined the lopsided funding extended to the health care delivery system as opposed to funding in the health areas of Lifestyle and Environment.

There must be an extension of current facilities to help the patient manage his life. There is a need for broad spectrum counselling in many social skills such as managing finances, physical environment, daily maintenance services, rehabilitational medicine, diet counselling, and speech therapy. Volunteer groups have an important role to play in the total treatment of the chronically ill. This extended care must be co-ordinated for the specific patient and not be a hodge-podge arrangement. This is especially important for the patients with multiple problems who are often forced into a bewildering array of services.

Chronic care goes beyond the health care professions. Unions, commercial and industrial companies, the mass media and service agencies should be involved in improving the attitudes towards chronic disease and the conditions under which people live and work.

The treatment of chronic disease is fragmented due to the supremacy of the acute care hospital and the fixed curriculum of medical schools. Time is lavished on the treatment of "interesting" conditions and the delineation of end-stage disease. Little effort is put into the education of physicians who will question the fundamentals of the health care delivery system in an attempt to realign it to the prevention and treatment of chronic disease. We can and must shift our academic interests towards the study of chronic illness. Only by the comprehensive prevention and treatment of chronic disease will we have a healthier population and a less expensive health care system.

Footnotes

1 David Dodge and Walter Martin, *Social Stress and Chronic Illness* (London, 1970) pg 13
2 T.S. Kuhn, *The Structure of Scientific Revolutions* (Chicago, 1962) pg. 25
3 *Stedmen's Medical Dictionary* pg 278
4 Anselm L. Strauss, *Chronic Illness and the Quality of Life* (Saint Louis, 1975) pg 2
5 Dodge and Martin, pg 31
6. Department of Physiology, *Gastrointestinal System* (1977) pg. 69
7. Dodge and Martin, pg. 72
8 Dodge and Martin, pg. 58

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them from making full use of their available intelligence. If given appropriate family and social supports, patients with less than normal intelligence can cope with their disabilities. However, when family anxiety or guilt is too great and the patient's emotional outbursts are not understood, mental disorders can become apparent, especially suicidal intentions. Psychosocial factors determine to what extent the patient reacts to his organic problems.

With every physical and organic ailment there are mental manifestations as the body reacts as a whole entity to a disability. It has not been denied that mental illness causes physical illness but it has been pointed out that a primary physical problem brings on psychic damage. The degree and type of change depends on the length of illness and its social visibility. The patient's general makeup, the timing in his life and other psychosocial factors of the organic illness, all influence the extent of mental change a given physical disability brings. □

Footnotes

1. Agnew, M.P., *Psychosomatics*, Am. J. Psychiatry 132(S):585,Mar. 1975.
2. Spergel, Ed.D., Ehrlich, George E.M.D. & Glass, Dorothea, M.D., *The Rheumatoid Arthritic Personality: A Psychodiagnostic Myth*, J. Academy of Psychosomatic Med., 19(2), Feb. 1978.
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4. Schwab, John, M.D., Traven, Neal D., Warkeit, George J. Ph.D., *Relationships between Physical & Mental Illness*, Psychosomatics Aug. 1978.

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could be explained by examining its individual components in a laboratory and rigorously testing and verifying hypotheses scientifically, Hewson was one of the first examples of a true experimental physiologist. His association with Hunter, Cullen and Franklin influenced him greatly towards the development of his cautious, empirical approach. His several new physiological findings and his refutation of old ones demonstrate the success of his new techniques and his modifications of existing ones. The fact that it took up to one hundred years to confirm and expand upon his findings shows his ability to make significant and correct conjectures during a time of limited resources and technology.

Today, we take sophisticated experimentation as the source for new discoveries in physiology for granted, but it should be realized that it did have its beginnings and William Hewson was present and an important contributor to them. In light of all this, his relative obscurity today as a man relevant to the development of physiology as a true science is unjustifiable. His experiments and conclusions should be brought to the attention of people generally interested in this field, and to anyone who regards the incorporation of the scientific method into physiology and medicine as a purely spontaneous or inherently obvious phenomenon. □

GUIDELINES FOR PUBLICATION

1) All articles intended for publication should be submitted to the editors before the deadline which is usually *six* weeks before the release of the Journal.

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4) References should be checked with the original sources, designated by Arabic numerals in the text, numbered in order of appearance and put on a separate sheet. Each periodical reference should include in order: the author's name and initials, title of the article, Journal name, volume number, page number and year. (eg., 1. Rosen HJ: Lumbar invertebral disc surgery: review of 300 cases. *Can. Med Assoc J., 101: 317, 1969.*)

5) The editors reserve the right to make such editorial changes as are deemed necessary to ensure correctness of grammar and spelling, clarification of statements and conformity to Journal style.

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